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Representations of the Cow and Calf in Minoan Art

Eleanor Loughlin

Ph. D

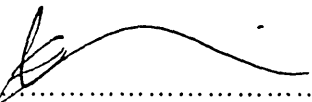
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Declaration of Authorship

I confirm that this thesis which is approximately 85,000 words in length, was written by myself and is my own work.

Author 

Date 25th March '00

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Abstract

Research into the depiction of cattle in Minoan Art has concentrated on representations of interaction between men and cattle, in particular, the images of bull sports. This emphasis has detracted from other types of cattle imagery. In this thesis the representation of the cow and calf in Minoan glyptic is assessed.

Discussion of representation and meaning are of equal value, as a full understanding of the potential meaning of an image is dependent upon a detailed knowledge of what is represented. Specific anatomical and behavioural details described in the images are therefore compared with known physiological and behavioural characteristics. The Bronze Age representations are found to be very accurate and detailed in their description of the relationship between the cow and calf.

Both the aesthetic and social contexts of the image are discussed in detail. The majority of representations of cows and calves are found on seals and sealings. The size, shape and restrictions of the medium as well as the range of potential uses of the stones (administrative, amuletic, jewellery) are considered. Faunal evidence from Bronze Age Crete and accounts of cattle in Linear B texts confirm the importance of bovines as an integral part of the agricultural system as well as providing evidence of the range of cattle exploited.

In discussing the potential meaning of the image, the survey draws on Bronze Age Aegean, Near Eastern and Egyptian evidence and later Greek (in particular Cretan) examples. Evidence from unrelated societies in which the cow is prominent is used as evidence of the diversity of possible meaning. The thesis concludes that it is not possible to categorise the image as specifically religious or secular; the range of potential meanings reflect the importance of the animal in all aspects of Minoan society.

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All figures are referenced in the text in square brackets [fig.]. Plates, referenced in the text in square brackets and labeled as 'No.' [No.], are found at the end of the thesis (separate wallet). The plates, Nos. 1-167 are images of cows, calves, young cattle and animals suckling young, listed in Appendix A. To avoid confusion, they are given the same number in the text references to plates [No.....] and Appendix A. As only those discussed in the text are included as plates, there are gaps in list of plates.

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Abbreviations

Bibliographical

<i>AA</i>	Aegean Archaeology
<i>AAA</i>	Athens Annals of Archaeology
<i>Acta Classica</i>	Acta Classica Universitatis Scientiarum Debreceniensis
<i>AEA</i>	Aegean Archaeology
<i>AJA</i>	American Journal of Archaeology
<i>ANET</i>	PRITCHARD, J. B. 1955, <i>Ancient Near Eastern Texts</i> , Princeton University Press, USA
<i>Antiquity</i>	Antiquity. A Quarterly Review of Archaeology
<i>AR</i>	Archaeological Reports
<i>Archaeology</i>	Archaeology. An Official Publication of the Archaeological Institute of America
<i>AS</i>	Anatolian Studies. Journal of the British Institute of Archaeology at Ankara
<i>ASAtene</i>	Annuario della Scuola Archeologica di Atene e delle Missioni Italiane in Oriente
<i>BAR</i>	British Archaeological Reports
<i>BCH</i>	Bulletin de correspondance hellénique
<i>BICS</i>	Bulletin of the Institute of Classical Studies
<i>BSA</i>	Annual of the British School at Athens
<i>CAJ</i>	Cambridge Archaeological Journal
<i>CMS Beiheft 1</i>	NIEMEIER, W.-D. 1981, <i>Studien zur minoischen und helladischen Glyptik, Beiträge zum 2. Marburger Siegel-Symposium 26-30 September 1978</i> , Mann, Berlin
<i>CMS Beiheft 3</i>	MÜLLER, W. 1989, <i>Fragen und Probleme der Bronzezeitlichen Ägäischen Glyptik, Beiträge zum 3. Internationalen Marburger Siegel-Symposium 5-7 September 1985</i> , Mann, Berlin
<i>CMS Beiheft 5</i>	MÜLLER, W. 1995, <i>Sceaux Minoens et Mycéniens, IVe symposium international 10-12 septembre 1992</i> , Mann, Berlin
<i>CVA</i>	<i>Corpus Vasorum Antiquorum</i> (1900 ff.)

<i>Hesperia</i>	Hesperia. Journal of the American School of Classical Studies at Athens
<i>Historia</i>	Historia. Zeitschrift für alte Geschichte
<i>JAS</i>	Journal of Archaeological Science
<i>JEA</i>	Journal of Egyptian Archaeology
<i>JHS</i>	Journal of Hellenic Studies
<i>JMA</i>	Journal of Mediterranean Archaeology
<i>JPR</i>	Journal of Prehistoric Religion
<i>Kadmos</i>	Kadmos. Zeitschrift für vor- und frühgriechische Epigraphik
<i>KrChron</i>	Kretika Chronika
<i>KTU</i>	DIETRICH, M. & LORETZ, O. 1976, <i>Die Keilalphabetischen Texte aus Ugarit</i> , Butzon & Bercker, Neukirchener Verlag
<i>Levant</i>	Levant. Journal of the British School of Archaeology in Jerusalem and the British Institute at Amman for Archaeology and History
<i>Man</i>	Man. Journal of the Royal Anthropological Institute
<i>Nature</i>	Nature. International Weekly Journal of Science
<i>OJA</i>	Oxford Journal of Archaeology
<i>PPS</i>	Proceedings of the Prehistoric Society
<i>Science</i>	Science. American Association for the Advancement of Science
<i>Semiotica</i>	Semiotica. Journal of the International Association of Semiotic Studies
<i>SIMA</i>	Studies in Mediterranean Archaeology
<i>Syria</i>	Syria. Revue d'art oriental et d'archéologie
<i>TALANTA</i>	Talanta: Proceedings of the Dutch Archaeological and Historical Society
<i>TAW I</i>	DOUMAS, C. & PUCHELT, H. C. (eds.) 1978, <i>Thera and the Aegean World I: Papers Presented at the 2nd International Scientific Congress</i> , Santorini, The Thera Foundation, London
<i>TAW II</i>	1980, <i>Thera and the Aegean World II</i> , The Thera Foundation, London
<i>TAW III</i>	1990, <i>Thera and the Aegean World III: Papers Presented at the 3rd International Scientific Congress</i> , Santorini, The Thera Foundation, London
<i>TAW IV</i>	(forthcoming), <i>Thera and the Aegean World IV: Symposium on the Wall Paintings of Thera, Santorini, Papers Presented at the 4th International Congress</i> , Santorini 30 September - 4 October 1997, The Thera

Foundation, London..

<i>Tier und Museum</i>	Tier und Museum. Mitteilungen der Gesellschaft der Freunde und Förderer des Museums Alexander Koenig - Bonn e. V
<i>WA</i>	World Archaeology

Collections and Catalogues

<i>AT</i>	LEVI, D. 1925-6, 'Le cretule di Hagia Triada' <i>ASAtene</i> 8-9, 71-156.
<i>Betts</i>	BETTS, J. H. 1967, 'Some unpublished Knossos sealings and sealstones' <i>BSA</i> 62, 27-45.
<i>CMS</i>	<i>Corpus der minoischen und mykenischen Siegel</i> 1964 ff, Berlin.
<i>CS</i>	KENNA, V. E. G. 1960, <i>Cretan Seals: with a Catalogue of the Minoan Gems in the Ashmolean Museum</i> , Clarendon Press, Oxford.
<i>CMGC</i>	SAKELLARIOU, A. X.- 1958, 'Les cachets minoens de la collection Giamalakis', <i>Études Crétois</i> X, Paris.
<i>GMA</i>	AMIET, P. 1980 (2 nd ed. rev.), <i>La Glyptique Mésopotamienne Archaïque</i> , Éditions du Centre national de la recherche scientifique
<i>KSPI</i>	GILL, M. A. V. 1965, 'The Knossos sealings: provenance and identification', <i>BSA</i> 60, 58-98.
<i>KZ</i>	HOGARTH, D. G. 1901, 'The Zakros sealings' <i>JHS</i> 22, 76-93 and LEVI, D. 1925-6, 'Le cretule di Zakro' <i>ASAtene</i> 8-9, 157-201.

Museums

<i>AM</i>	Ashmolean Museum, Oxford
<i>BM</i>	British Museum, London
<i>HM</i>	Heraklion Museum, Crete
<i>HMs</i>	Heraklion Museum, Crete (sealings)
<i>HM G</i>	Heraklion Museum, Crete (Giamalakis Collection)
<i>HMM</i>	Heraklion Museum, Crete (Metaxas Collection)
<i>MM</i>	Metropolitan Museum, New York

Dates

AcN	Aceramic Neolithic
EN	Early Neolithic
MN	Middle Neolithic
LN	Late Neolithic
EN	Early Neolithic
MN	Middle Neolithic
LN	Late Neolithic
EM	Early Minoan
MM	Middle Minoan
LM	Late Minoan
LH	Late Helladic

OPP	Old Palace Period
NPP	New Palace Period
PPP	Post Palatial Period

Miscellaneous

ChT	Chamber Tomb
ShGr	Shaft Grave
T	Tomb
UO	Unknown Origin
PT	Pose Type

Chapter 1: Introduction

This thesis will explore the representation and possible meanings of images of cows, calves and young cattle in Minoan art. The prominence of cattle iconography has long been recognised in the Neolithic and Bronze Age arts of Crete (Younger 1989:54; Kourou & Karetsou 1997:113) and although there are many studies of the iconography, the majority of these focus on images of bulls. The current study, in discussing the representation and potential meaning of images of cows, calves and young cattle, seeks to broaden our understanding of the relationship between men and cattle during the Bronze Age.

This work focuses on low relief and two-dimensional images, primarily on seals and sealings. Although the various catalogues of Minoan glyptic, in particular, the *Corpus der minoischen und mykenischen Siegel* (CMS:1964 ff) have proved indispensable, first hand study of seals and sealings (in particular, those held by Heraklion Museum, Crete and the Ashmolean Museum, Oxford) forms the basis of this study. Three-dimensional images of cattle will be referred to comparatively but are not included in the main discussion.

When studying a particular group of images it is vital to consider exactly what they might represent. Chapter 2 therefore discusses the archaeological evidence for the presence and role of cattle on Crete during the Neolithic and Bronze Age. This chapter draws on faunal analysis and other archaeological evidence relating to the exploitation of cattle: the largest, most powerful and potentially most useful animals on Crete during this period. Consideration will also be given to whether it is possible to identify different sexes, ages and types, including wild, domestic and feral animals.¹

The third and fourth chapters consider the representations of cows, calves and young cattle. The detailed discussion focuses on what the images represent in terms of anatomical description and the depiction of specific behavioral traits. These chapters will also address some of the problems inherent in the process of identifying what is represented when the image is damaged, worn or summary.

The fifth chapter will consider the possible meanings of the images of cows, calves and young cattle. A wide range of comparative material will be drawn on in order to emphasise the diverse potential meaning of these images and to temper our own preconceptions.

This thesis stems from the compilation of a catalogue of over six hundred images of cattle from Bronze Age Greece. It was during the course of this research that the decision was taken to concentrate on a particularly neglected area of cattle iconography. Although the whole catalogue is not relevant to the current study and will therefore not be included, a list of seals and sealings from Cretan contexts that bear images of cattle is included as Appendix E.

Chronology

The issues surrounding the absolute, relative and local chronologies of the Aegean Bronze Age have, in recent years, been hotly debated.² Although the focus of the current thesis is the representation and possible meaning of images rather than their chronological context, it is necessary to outline the range of chronological terminology used [table 1.1]. Although the value of using the same terminology to define both the material and periods is debatable, the tripartite system (EM, MM, LM) devised by Evans (1921b-1936) is still followed by most, including the majority of authors of the *CMS* and will therefore be followed here. In addition, however, where individual authors classify pieces by period (eg. *CMS* I, II2, II3 & IX) and date (eg. Younger:1989; 1993) these terms will be used. Issues relating to the transition from LN - EM and the third Palace Period at Knossos are discussed in Chapter 2. Chronological abbreviations are listed in the main list of abbreviations.

DATE	CRETE	PERIOD
6000	ACERAMIC	
	EN I	
5000	EN II	
	MN	
4000	LN	
3000	FN	
-	EM I	
-		
-		
-		
2500	EM II	PREPALATIAL PERIOD
-		
-		
-		
2000	EM III	
-		
-	MM IA	FIRST PALACE PERIOD
-	MM IB	
-	MM II	
-	MM III A-B	
1500	LM IA	SECOND PALACE PERIOD
-	LM IB	
-	LM II	
-	LM IIIA	THIRD PALACE PERIOD
-	LM IIIB	
-	LM IIIC	
1000		POSTPALATIAL PERIOD

Table 1.1 Chronological Chart

Defining an Approach: Representation and Meaning

In actuality, anything can mean anything else (Hospers 1982:184) and the search for meaning in art is often hampered by a lack of clarification of what is specifically intended by the question 'what does it mean?'. For example, 'what does it represent?' and 'what does it symbolize?' are very different questions and yet either can be implied by the question 'what does it mean?'. In this thesis representation and meaning will be discussed separately. It is therefore important to clarify what is understood by the terms 'representation' and 'meaning'.

In terms of communication, the success of a two-dimensional representation of a three-dimensional object hinges on perception; both the artists' and audiences' perceptions of the three-dimensional object and the two-dimensional representation. In other words, it is the similarities in the way we perceive both the representation and the represented rather than the similarities between the represented and representation that is the important factor (Walton 1992:103). When a representation is considered in a context other than that in which it originally functioned, what is perceived can never correspond completely to what the artist or audience of the creation context perceived since the experience and perception of what is represented is not a constant. It is therefore important to bear in mind that the process of determining what a Minoan image represents and means not only involves translation ...*at the level of language: from the visual to the verbal*, but also ...*at the cultural level: from Minoan to modern* (Morgan 1985:6). Visual art is not produced with an eye to its translation into the verbal. The semantics of a visual and literary language may be incomparable and thus any translation will prove at least incomplete and unsatisfactory and at worst a distortion (Cardew 1978:17-20; Korn 1978:162-4). It is also essential to recognize that the translation from Minoan to late twentieth century is made from a modern contextual standpoint, using ...*contemporary cognitive schemes* (Morgan 1985:6).

The innate human desire to recognize, our inclination to focus on the familiar, can lead to the false assumption that because an image resembles an object, it is a depiction of that object (Clottes 1989:38-9; Davis 1989:181-182).

Because of the possibility of ambiguity, fortuitous resemblance, and the variability of seeing-as, no amount of study of the visual properties of a mark can definitively tell us whether it is an image, and precisely what it is an image of.
(Davis 1989:183)

An immediate identification of a representation that is based solely on an initial recognition of the familiar (a gut response) is a denial of the range of possibilities. Although recognition of what appears familiar is inevitable and may prove valuable it should be tempered by an acknowledgement and consideration of the wider range of possible perceptions.

The problems of ambiguity and differing interpretations of what is represented are not restricted to images that are layered, sketchy (Clottes 1989:31-3) or fragmentary but can arise in

circumstances when the information is complete and individuals are provided with the same evidence. For example, on examining an unpublished fragment of wall painting from Thera I recognised a representation of a bull's head which others, who do not share my bovine preoccupations, had identified as a snake head with extended forked tongue. It is important that we question our own perceptions, remain open to the perceptions of others and accept that on occasion it is better to admit to not knowing what is represented rather than force an ambiguous image into a specific category (Clottes 1989:38, 42). It is further important to be aware that the process of decipherment or interpretation, like language learning, is a cumulative process (see Lorblanchet 1989:115-16, fig. 4.4) and accept that our interpretations of individual images may change as our knowledge of the language grows.

Just as an initial recognition of what appears familiar can lead to incorrect or inadequate explanations of what is represented it is also possible to place too much value on an initial emotional response. Such a response is not dependent upon an understanding of the language (Korn 1978:161-2) and it is important not to equate this reaction with an understanding of meaning. A particular image may have a different effect on a different audience at different times and we cannot assume that our specific emotional response is comparable to the emotional response that the image would have generated in its original context (Hospers 1982:185-6). A recent illustration of this is the extreme change in emotional response and attitude to Manet's *Olympia* (1863) in the space of a little over one hundred years. Following its exhibition at the *Salon* of 1865 Manet was widely and vehemently criticised for representing a prostitute in the mode of Titian's *Venus of Urbino* (1538). Today the painting is widely regarded as an attractive and inoffensive image.³

When an interpretation is based on recognition of the familiar and an emotional response, the ensuing pronouncements can have a long-term detrimental effect on our understanding of what an image may represent and mean. This has been the case with the study of the Campstool Fresco, Knossos (LM II/IIIA) (Evans:1935b: 379-396, figs. 318, 319, 323, 324, 325, pl. XXXI) and in particular a figure known as *la Parisienne* [fig. 1.1].

The seated lady...has had a certain success in the modern world, and is often referred to as 'la Parisienne'. Her elaborate coiffure and suspiciously scarlet lips are certainly marks of a highly artificial social life...
Evans (1935:385)

Higgins described the painting as *...the most charming of all surviving Cretan paintings* (1981:95). These comments and indeed the name given to this figure inform us however more of twentieth-century perceptions of representations of women rather than addressing the issues of what the image represents. The emotional, immediate response was widely accepted as ample proof that this is a representation of a woman and researchers subsequently focused on the status or rank of this woman in Minoan society.



Fig. 1.1



Fig. 1.2

Cameron's (1964) addition of a fragment revealing that the arm is not represented and recognition of distinctive features such as the *sacred knot* have led some to describe her as a priestess (Immerwahr 1990:95; Long:1974:45) or goddess (Hood 1994:68) while Long (1974:45) moved the image into a broader context through comparison with a figure represented on the Ayia Triada Sarcophagus (Long 1974:45, fig. 17, 37, 52) [fig. 1.2] which wears a similar robe, is represented with no visible arms and like *la Parisienne* is a different size to the other figures represented in the scene.⁴ A comparable figure is seen on CMS II7 29. The striking distinctions between *la Parisienne* and the other figures represented in the Campstool Fresco surely demand a reassessment not only of what the image means but also of what it represents.⁵ Instinctively we perceive the image as a woman but it could equally represent an anthropomorphism or statue. Hägg and Marinatos state that there are no representations in Minoan art of anthropomorphic cult images, adding that *...deities are represented, of course, but not as stiff statues* (1983:186). In a motionless image it may however prove difficult to distinguish between the representation of a moment in time and a stiff or static pose and some of the features of the images mentioned above, such as the absence of arms and legs and the size and position of the figures in relation to others in the field bear a striking resemblance to the way

in which statues are distinguished in Egyptian and Near Eastern Art (Schäfer 1986:105-6; Hägg and Marinatos 1983:186, fig. 26).⁶

To avoid interpretations based on an immediate and emotional response it is therefore important to consider an image in its original social context. Information relating to both the represented and the representation and their function within society can help distinguish exactly what is represented. For those studying ancient art however the art object itself represents a significant proportion of, and in some cases the only evidence of, the context in which the art was produced (Faris 1978:320-21). When ancient art historians ask 'what does it mean?' they are often asking 'what does it reflect of its original context?'. An image is indeed as much a reflection or indicator of a specific artistic tradition as a representation of a specific object (Faris 1978:317; Hospers 1982:142-177; Schäfer 1986:1).

In cases where our knowledge of the social context is limited it is very important to consider the images in the broader artistic context in order to determine the specific artistic conventions and canons of the time and thus understand the individual image more fully. A language of form, like any other type of language, is a means of communication. Its success is dependent upon the systematic and formulaic use of elements that are understood by both the artist and audience (the speaker and listener). As is the case in spoken languages effective communication is dependent upon specific canons, widely recognized and sufficiently adaptable to convey both specific and diverse information. In his discussion of the production and reception of *stylistic messages*, Wobst asserts that standardized, frequently used, messages require less energy input at the point of both production and reception than complex, highly variable messages and therefore prove more effective (1977:322-3). This is consistent with the findings of Korn who described the use of pairs of circles to represent eyes in Abelam (Papua New Guinea) paintings as an example of the ...*economical and systematic use of visual symbols* (1978:162-3). Davis similarly speaks of continual replication in the cave art of Gargas, France where a double S-curve is repeatedly used, both horizontally and vertically to represent a part or the whole of a bison (1989:182). It is however vital when considering the individual elements of an image not to lose site of the whole scheme (Schapiro 1969:238). When several elements are represented within the same field the space between them defines the nature of the interaction (Schapiro 1969:229). In the case of representational images this often defines not only syntactical interaction but also represented

interaction. The positions of the individual elements in the field are therefore a key factor in determining what is represented and the possible meaning of the image as a whole.

The Minoan language of form further ...*generate(s) complex meaning and it is the recurrent use of associations which most pervasively reveals meaning* (Morgan 1985:14-15) as Angelopoulou identifies in her discussion of iconography in Thera nature scenes (1997:4-5; see also Clottes 1989:39, fig. 1.6). The evidence for *continual replication* in ancient art has led some to suggest that there was a tendency to create generalized rather than specific representations (Warren 1997:169). This may however simply reflect our own lack of understanding or limited perception of the features that distinguish different types of people, animals and objects. Even if a representation is generalized it need not follow that the meaning also was. For example, the context and circumstance of the dedication of identical clay figurines of non-specific quadrupeds may endow them with very different meanings.

An understanding of the structure of a language of form cannot be equated with an understanding of meaning (Korn 1978:162-3). In the case of Thera miniature painting Morgan (1985:5) states that it is the question of meaning or interpretation rather than representation that generates the greatest divergence of opinion. When confronted with different interpretations of what an image means it is important to consider the possibility of multiple or layered meaning (Morgan 1985:5-7, 19) rather than looking only to identifying one right answer. On the other hand, in attempting to identify the multifaceted nature of meaning one may read meaning into a piece that was neither intended by the artist nor compatible with the context (Hospers 1982:184-5).

...the moment we step from meaning which is explicitly stated within the image to meaning which is implied, we move from comprehension to inference and hence to provisional explanation.
(Morgan 1985:18).

This problem is further compounded by the fact that the distinction between explicit and implicit meaning may itself prove controversial. A clear and detailed study of what is represented and the artistic and social contexts of the image is essential in determining potential meanings and the extent to which they can be classified as explicit or implicit.

An important aspect of meaning, in the current thesis, is the potential explicit and implicit

symbolic meaning of the image. It is therefore essential to consider the processes by which an image becomes symbolic. Beardsley distinguished between *natural* and *conventional bases* (Beardsley 1958:289-90; Hospers 1982:178). The *natural basis* is derived from the recognition of natural attributes or similarities between the object and what it symbolises while a *conventional basis* is established by agreement within a particular group of people or society (Hosper 1982:177-178).

A symbol used only once is symbolic and yet it is the repeated use of the symbol that establishes it as such within a given context. The process of actually using, clarifying and establishing the symbolic nature of an object is an essential aspect of the process. It is only through use and familiarity that an image becomes established to such an extent that it is recognizable as a symbol (Beardsley 1958:290; Hospers 1982:182-3; Wasilewska 1994:69). It is the recognition of repetition that often leads archaeologists, anthropologists and art historians to identify an element as being symbolic, even when unable to identify what is being symbolized or even represented. In order to establish what is symbolized Beardsley (1958:291) says that one should begin with the question of whether the symbol has a primarily *natural* or *conventional basis* and recognise that it is always more difficult for those not party to the process of establishment to determine with any degree of certainty the meaning of a symbol consisting primarily of a *conventional basis*.

As with any image, it is important to consider the broader context. In the case of symbols this involves assessing the relationship between symbols, within specific *symbolic system(s)* (Goodison 1989:1-2, 191). This is vital in determining how symbols are grouped or juxtaposed as the meaning of a symbol may be in part derived from these groupings (Renfrew 1985:13-14). Beardsley's emphasis on determining the basis of the symbol requires that we consider not only the *symbolic system* but also the society in which the symbol functioned (see also Goodison 1989:56). If the symbolic element contrasts or stands out from the other elements ...*we are invited to dwell on it and treat it as a symbol*. (Beardsley 1958:291). It is also true that if an image does not appear to represent a ...*scene from life* then it may also have symbolic significance. Goodison, for example, describes CMS VII 177 [fig. 1.3] in which a bull is represented with two bird like creatures and an octopus as perhaps representing ...*a collection of meaningful symbols in a particular relation to each other* (1989:70).



Fig. 1.3

Replication is an important aspect in determining what an image symbolizes. It must however be born in mind that the symbolic significance of a particular image may vary from context to context and apparent divergence may reflect layered or multiple symbolism. For example, the swastika is symbolic of the sun but the fuller meanings of it in different societies and groups, for example Aryan, Nazi and Jainism are very different.⁷ Even within individual societies, specific groups of people may interpret a symbol differently. For example, a diamond shaped figure with triangular appendages is interpreted by Dakota men as representing the fallen enemy and therefore seen as symbolic of victory in battle while to the women it represents a turtle; symbolic of fertility.⁸

In this thesis, analysis of the images of cows, calves and young cattle in Minoan art will be divided into two distinct sections: 1) a detailed study of what is represented incorporating all the Minoan examples of this image 2) identification of possible meanings and spheres in which the images may have had symbolic significance. Throughout both sections the discussion will focus not only on the frequently recurring elements of the image but also the variations in an attempt to determine the complexity of the images. The intention of the current study is not to assign the images to a particular area of Minoan religious or secular life but to provide a fuller understanding of what the images represent, by exploring spheres of possible significance and the relationships between the specific motifs and other areas of Minoan iconography.

¹ Clottes (1989:21) discusses the extent to which European Palaeolithic art has been considered a reflection of the faunal assemblage.

² For a summary of the discussion surrounding these issues see Dickinson (1994:9-22).

³ A. Krell 1996, *Manet and the Painters of Contemporary Life*, Thames and Hudson, London.

⁴ The Ayia Triadha sarcophagus figure is smaller than the other figures in the field while 'la Parisienne' is larger than the other figures in the Campstool Fresco.

⁵ Clottes (1989:50) emphasizes the importance of identification of what is represented prior to considering meaning.

⁶ A reassessment of the types of images described above should be carried out in conjunction with a study of the archaeological evidence for actual statues (Hägg and Marinatos 1983:190-196; Evans 1930:523, fig. 365).

⁷ W. Kirfel (1967) *Encyclopedia of World Art*, vol. XIII, McGraw-Hill Book Company, inc., Italy, p.830.

⁸ F. Herrmann (1967) *Encyclopedia of World Art*, vol. XIII, McGraw-Hill Book Company, inc., Italy, p.837.

Chapter 2: Neolithic and Bronze Age Cretan Cattle

There is a tendency to equate the prominence of representations of nature in Minoan art with a conscious watching of nature (Gill 1985:63) which leads to the assumption that Minoans were ...*astonishingly acute and detailed in their observational powers* (Warren 1997:170, 175). It is more likely that such imagery reflects the way Minoans interacted with and therefore perceived their environment (Lloyd 1983:8; Dowden 1992a:123-133; Buxton 1994:80-113).

In stark contrast to pre-industrial agriculturally based societies including Bronze Age Crete (Dickinson 1994:45), only about 3% of Britain's working population is currently employed in agriculture.¹ The proportion of the population not involved in agriculture in Bronze Age Cretan society was likely to have been insignificant and even craft specialisation was probably not a full time occupation (Dickinson 1994:45). The Minoan craftsman therefore not only lived in what we would describe as a natural environment but also depended for his survival on an understanding of and ability to utilise nature. In contrast the majority of modern British artists, whose work draws on nature, are spectators rather than participants in the natural environment. This relationship is epitomised by the Scottish painter, J. D. Adam (1842-1896) who kept a herd of highland cattle specifically for painting.² When the relationship between man and nature is of paramount importance to a particular society or individual this often features prominently in the art. This is exemplified by the art of the hunter gatherer Amerindians (Schrimff 1989:75), the predominance of animals represented in Palaeolithic art (Clottes 1989:23) and even the prominence of animals in the work of the 20th century aboriginal artist, Najombolmi who was also renowned as a skilled and successful hunter (Haskovec & Sullivan 1989:59-60). It is therefore important not to equate the representation of detail born of familiarity and interaction, a ...*hunter's* or *butcher's eye* (Clottes 1989:23) with exceptional observational skills.

This chapter will consider the archaeological evidence for cattle on Crete during the Neolithic and Bronze Age. The intention is not only to establish the types of cattle present on the island but also explore the interaction between man and cattle during this period and thus establish the broader context of both the artist and image. Prior to focusing on Crete, it is necessary to consider the distinctions between the different types of cattle that existed during this period and the key issues surrounding the process and results of domestication.

Wild Cattle

Modern cattle are descended from the wild urus, aurochs or *Bos primigenius*.³ Now extinct, *Bos primigenius* originally ranged across Asia, Europe, India and North Africa⁴ from the Pleistocene to the 17th century AD.⁵ *Bos primigenius*, like most ruminants, was a herd animal whose grazing and browsing activities were most suited to woodland and open scrub (Butzer 1964:421; Grigson 1969:284-287; Clutton-Brock 1987:63).⁶ Remains dating from the European Pleistocene indicate that the bull stood c. 1.8 m at the withers (Epstein & Mason 1984:8) and had large horns.⁷ The cow was smaller with shorter and different shaped horns (Clutton-Brock 1987:64; Armitage & Clutton-Brock 1976:330). The theory that smaller bones, now attributed to the cow, were of a subspecies of dwarf aurochs has been discounted (Issac 1962:197; Clutton-Brock 1987:64).⁸ Epstein and Mason describe the adult bull as having a black coat with a whitish band running down its back, ... *white curly hair between the horns, and white around the muzzle. Cows and calves were red or reddish brown* (1984:8). The cattle of Northern latitudes were probably larger with thicker coats than those of more Southern regions which may have had longer limbs in proportion to body size as well as paler coats (Clutton-Brock 1987:64).⁹

"Domestication': concept and definition"¹⁰

Definitions of the term 'domestication' have been widely discussed (Bökönyi 1989; Ducos 1989; O'Connor 1997). Difficulty in establishing a concise definition arises from the fact that the term 'domestication' encompasses a wide variety of relationships not only between man and animals but also animals and animals (O'Connor 1997:152); as well as being used to describe both the initial process and the developing relationship (Bökönyi 1989:23; Ducos 1989:29). As this thesis is concerned with the relationship between man and cattle the determination of a precise definition covering all possible domestication relationships is not of great importance; rather it is essential to define what is meant by 'domestic cattle'. Reed's (1984:2) definition of domesticated animals as ... *those whose breeding can be controlled by humans*, will be taken as the basic premise for domestication in cattle.¹¹ Although the activities of man can also affect breeding and numbers in wild populations and other factors, including containment and the control of movement are important aspects of domestication (Grigson 1969:287), the breeding of animals *under artificial conditions* (Grigson 1969:287) that is, regulated by man, is the most constant and exclusive defining factor of domesticated cattle.

The symbiotic relationship which exists between the domesticator and the domesticated is specific to each relationship (O'Connor 1997:152). In the case of the relationship between man and cattle, man invests time, energy and resources into protecting, feeding and caring for the animal which in

turn provides a wide range of basic commodities and motive power (Reed 1984:2). Within this broad definition there are innumerable types of *production systems* (Wilson 1995:13), determined by such factors as the types of flora and fauna, geographical and environmental factors, the level and type of movement and *production objectives* (Wilson 1995:13). Crete provides evidence of a wide range of *production systems* (Wilson 1995) from the specialised rearing of particular crops and animals to more diverse systems forming the basis of mixed farming economies.

Osteological and Behavioural Changes in Domesticated Cattle

A decrease in body size and a reduction in size variation between male and female animals (Grigson 1969; Clutton-Brock 1987:22) distinguish the early stages of domestication in mammals. This trend is often furthered by the selective breeding of different sizes for different purposes (Clutton-Brock 1987:22), resulting in extreme size variation, as is evident in the cases of Highland cattle bred for meat and Jersey cattle bred for milk.

The thickness and type of coat may also change as a result of the climate and environment in which the animal is reared (Clutton-Brock 1987:22-23). Although the evidence is limited, Ryder (1984a) suggests that the coats of domesticated cattle became coarser. Changes also occur in the pelage¹² of individual breeds as animals are selected for specific or unusual markings. Distinctive markings enable owners to distinguish their cattle from other animals, wild or domesticated and in some societies add to the prestige or status of the owner (Clutton-Brock 1987:22; Coote 1992:247, 250-2). Agar Dinka will, for example, trade two or three oxen with plain coats for one with good markings (Coote 1992:252).

Physiological changes occur as a result of controlled feeding. In well-nourished domestic mammals a layer of fat develops between the skin and muscle and flecks of fat occur in the muscles whereas in wild animals fat tends to be stored around the organs (Clutton-Brock 1987:23). Brain and sense organs appear to decrease in proportion to body size (Clutton-Brock 1987:23). It is however the osteological changes that are the most marked (Arbogast, Méniel & Yvinec 1987:24). The earliest stage, most evident in dogs, some breeds of pigs and cattle is the shortening of the skull and jaw, followed by a reduction in teeth size (Clutton-Brock 1987:24). The horns of cattle, sheep and goats tend to show a wide range of changes, often causing mutation of the skull. Bulls' horns become the same length or smaller than cows' (Armitage & Clutton-Brock 1976:330; Grigson 1982a:9). Horn growth is continuous throughout life but may vary depending on nourishment and stress levels (Dyce & Wensing 1971:2). Variations in the rate of growth are indicated by the varying thickness of growth rings, particularly around the base of the

horn (Amorosi 1980:23-4; Frandson & Spurgeon 1992:210). These are most noticeable in the cow where they indicate a decrease in growth during pregnancies (Dyce & Wensing 1971:2). As in the case of distinctive markings, it has been suggested that breeds exhibiting distinctive horns such as the Ankole cattle of East Africa and the lyre horned cattle of Egypt may have been bred for particular ritualistic purposes or as status symbols (Clutton-Brock 1987:24). Cattle horns can also be trained; a practice common throughout the world (Coote 1992:253).

Exercise levels can effect the development of ...*muscle ridges and facets for articulation of the joints*, which become smaller in animals whose exercise is limited and more pronounced in draught animals such as oxen and shire horses (Clutton-Brock 1987:25).

Protection from natural predators and breeding in confinement results in domesticated animals developing temperamental and behavioural traits distinct from those of their wild predecessors. Species selected for domestication are, to varying degrees, of a social rather than solitary disposition and are therefore open to domestication.¹³ During the process of domestication animals that exhibited wild traits and proved difficult to handle would be killed or escape, resulting in a decrease in this type of gene in successive generations (Reed 1984:4).¹⁴

Behaviour is also drastically altered by the castration of male animals and to a lesser extent the spaying of females. The increased docility brought about by castration enables man to control animals with greater ease; a particularly useful tool when dealing with larger animals such as cattle. If castration is carried out within the first few weeks of life it will affect physical development. The bones continue to grow in length rather than girth and there is an increase in the quantity of body fat (Clutton-Brock 1987:25; Ziegler and Letellier 1977:17). Castrated oxen also develop longer and different shaped horns from cows and bulls (Armitage & Clutton-Brock 1976:332-334; Armitage 1982; Grigson 1982a:9). Bulls that are castrated at an older age retain masculine features (Russell 1974:213).

The Protection of Animals Act (1964) states that cattle castrated over the age of three months must be given an anaesthetic (Russell 1974:213) and bull calves reared for meat are usually castrated between 2-8 months. Aristotle (*History of Animals* 632a.1) stated that calves should be castrated at one year. The Agar Dinka castrate male calves at c. 9 months (Coote 1992:252) while highland cattle are castrated between 5-6 months.¹⁵ In India however cattle are castrated between 12-24 months (Lensch 1987:102) as was probably also the case in ancient Egypt (Ikram 1995:10).

There are various methods of castration. A band can be tightened around the testicles of a very young calf while in older animals it is necessary to cut the spermatic cord (Russell 1974:213). In India anaesthetic is rarely used and the animal is tied up and its testicles crushed with a stone, a method similar to that used in medieval Europe (Lensch 1987:102). In ancient Egypt the method was probably similar to the modern Egyptian practice of making an incision in the scrotum through which the testicles are drawn and severed (Ikram 1995:10).

Domestic animals, which return to the wild revert to a type closer in terms of physical features and temperament to their wild predecessors although also retaining features of their domestic relatives. Such animals can not become *truly wild* and are instead classed as feral (Reed 1984:2; Clutton-Brock 1987:22). Domesticates can become feral in a short space of time. This is illustrated by the case of the New Zealand feral pig which in less than one hundred years has reverted back to a type more akin to the wild boar than the domestic pig (Clutton-Brock 1987:22). Similarly the cattle left by the migrating islanders on the Scottish island of Swona only twenty-five years ago have not only become feral but have after only five generations of natural selection developed sufficient genetic distinctions to be recognised as a new breed. In terms of temperament they have become not only wary of man but at times aggressive (Dobson 1999:9).¹⁶

The Domestication of Cattle

The Origins of Domesticated Cattle

Identification of the earliest archaeological evidence of domesticated plants and animals is fraught with problems. The process of domestication probably developed gradually from a period when *...plants were nurtured and animals kept in captivity* rather than being a sudden and distinct turning point (Clutton-Brock 1987:50-51). Although osteological changes may be indicative of domesticated stock it is possible that the remains of an animal showing some of the characteristics of domestication may be those of a wild mutant as all the changes known to have occurred in domestic animals have also appeared in wild individuals (Isaac 1962:197).

The identification of the earliest evidence of domestication is not of major importance to this discussion. It is however important to establish in which regions domesticated cattle were exploited prior to the colonisation of Crete and how domestication spread. Despite the range of breeds it is still possible to divide early domesticated cattle into two types; zeboïd (humped)¹⁷ and humpless, the latter being subdivided into Longhorned (*Primigenius*) and Shorthorned (*Bos longifrons*) varieties (Epstein & Mason 1984:8).

Longhorn or *Primigenius* are the earliest type of domestic cattle descended directly from *Bos primigenius* and have distinctive wide and flat parietal bones to support large horns. It has been argued that the earliest domesticated longhorn cattle originated in Southwest Asia (Cole 1972; Epstein & Mason 1984:8-10; Clutton-Brock 1987) while others believe that domestication first occurred in the Southern Balkans (Renfrew 1972:273). The possibility that indigenous cattle were domesticated in different regions during the same period rather than all domesticated cattle originating from a primary source should not be ruled out, particularly in the light of size differences between the early domesticated cattle of Anatolia and Northern Greece (Perkins 1969:178-179; Bökönyi 1970:166, 1976:20). The importance of the evidence to this current study is however that domesticated longhorn cattle are attested in Northern Greece, Anatolia and Egypt from the early 7th millennium.¹⁸

The earliest domesticators would have utilised the animals in the same way as hunter-gatherers, thus exploiting meat, bones and skin/hides. Only as a further result of domestication did the value of other uses and commodities including milk, wool/hair, faeces/urine, pest control, motive power, war, sport and prestige become evident (Sherratt 1981; 1982; 1983; Reed 1984:2; Clutton-Brock 1987:62; Wilson 1995:10, table 1.2). Such commodities can be harvested from or provided by cattle on an on going basis without ruling out the option that the animal be slaughtered for meat, bones or skin/hides at a later date.¹⁹ This second phase of domestication, known as the *Secondary Products Revolution* (Sherratt 1981; 1982; 1983) is thought to have occurred between five to three millennia after the development of agriculture in the Near East and Europe (Sherratt 1981:262). It involved the domestication of new genera, including equids (Sherratt 1981:272-275) as well as changes in the breeding and utilisation of domesticated animals including cattle.

It is now widely agreed that Shorthorn cattle or *Bos longifrons*²⁰ evolved from domesticated Longhorn cattle (Epstein & Mason 1984:11).²¹ The earliest examples of Shorthorn cattle date from c. 3000 BC when they began to replace Longhorn cattle in Mesopotamia (Zeuner 1963b:13; Epstein & Mason 1984:11). It is however probable that Shorthorn cattle were bred from Longhorn cattle in several different regions rather than originating from one source (Epstein & Mason 1984:11). Epstein and Mason (1984:11) state that Shorthorn cattle were bred because of their greater capacity as milk producers; an increased demand for milk stemming from the growth of urban societies. The advantage of milking rather than slaughtering domesticates is that they provide a regular source of storable nourishment rather than serving as a one off source of

meat (Sherratt 1981:262). Milk provides four to five times more protein and energy for the same amount of feed as an animal killed for meat (Sherratt 1981:284). These factors, combined with the use of cattle for motive power, ensured their continued and increased importance during the secondary stage of domestication (Sherratt 1981:275; Halstead 1987:77).

Milking

As this thesis focuses, in part, on the cow, the exploitation of cattle for milk is of particular importance. In contrast to the highly bred milk-cow we are familiar with today in Northwest Europe, the cattle exploited for milk during the Bronze Age, in terms of both stature and temperament, were probably far more akin to wild cattle. Creating an environment in which the cow would produce milk and lower it to man rather than her calf would therefore have been more difficult than it is for the modern dairy farmer. The simplest way to ensure that milk is produced is to make use of the calf. A cow with a calf will produce milk and if the calf is removed during the day there is a build up of milk. If the calf is brought back at the time of milking its presence stimulates the *milk ejection reflex* or *milk let-down* (Cochrane 1946:98, 244-5; Sherratt 1981:277; Fraser & Broom 1997:224). This is a conditional reflex that is stimulated by a range of psychological and physical factors (Cochrane 1946:98, 244-5; Russell 1974:147; Webster 1987:233).²² If the skin of a dead calf is draped over an object, the milker or another calf, it may, when presented to the mother, act as a stimulus (Amoroso & Jewell 1963:130-1). Stimulating the teat, mammary gland and udder in the same way the calf does by licking and butting the cow prior to feeding will also stimulate the milk let-down (Cochrane 1946:244; Webster 1987:77; Fraser & Broom 1997:224). The same effect is achieved by stimulating the vagina and cervix. Blowing into the vagina while milking is a commonly used method that necessitates the cow being milked from behind (Amoroso & Jewell 1963:127, 130-2; Sherratt 1981:277). An environment associated with milking or particular sights and sounds can also serve as stimuli (Amoroso & Jewell 1963:129), as is the case with modern dairy cattle, who are stimulated to lower their milk by entering the milking parlour (Webster 1987:233; Fraser & Broom 1997:224).

Milking is not an easy process. It requires skill on the part of the milker and the right stimuli for the cow to lower her milk (Cochrane 1946:96, 242). Factors such as sudden shocks or loud noises can cause a release of adrenaline which prevents milk let-down (Russell 1974:147; Fraser & Broom 1997:225). Once the cow has been stimulated there is only a short period of time during which milking can commence before the milk is retained in the

udder (Russell 1974:147; Webster 1987:233). To ensure the continued production of milk it is necessary to milk frequently, about two to three times a day, as a cow is conditioned to produce milk for three to seven feeds a day and stops when the calf is weaned (Cochrane 1946:98; Russell 1974:151; Webster 1987:232).

Cows, like bulls, can also prove aggressive, kicking out through pain, fear or even habit and farmers may find it necessary to tie the back legs of the animal together to protect themselves during milking (Amoroso & Jewell 1963:127, 130-2; Russell 1974:172). An alternative method of dealing with a kicking cow is to hold up her tail vertically and scratch her rump (Russell 1976:48).

Ancient Egyptian tomb paintings and reliefs of agricultural life frequently include representations of herdsmen milking cows. In the 6th Dynasty tomb-chapel of the Mastaba of Kagemni, Saqqara, one herdsman restrains the cow while another milks. The cow turns to lick the herdsman as she would her calf (Houlihan 1996:fig. 8). In a similar image on a relief fragment probably from a 5th Dynasty tomb, Saqqara [fig. 2.1] (Harpur 1985:39, fig. 8) the back legs of the cow have been bound. In an 11th Dynasty relief from Deir al-Bahari (Houlihan 1996: fig. 9) the calf is represented tethered to the cow's front leg intended no doubt to serve both as a stimulus and a calming influence.

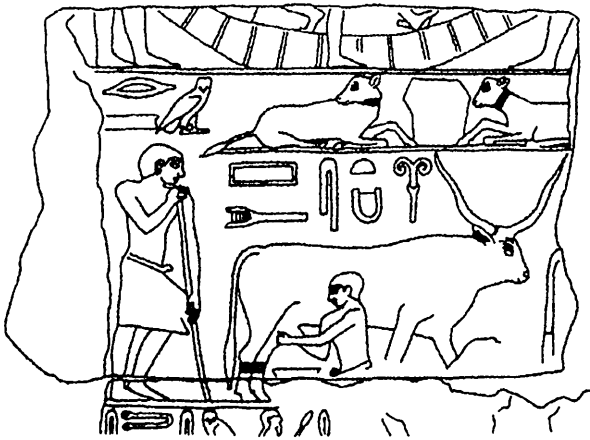


Fig. 2.1



Fig. 2.2

In a limestone relief from the tomb of Ti, Saqqara (c. 2650-2400 BC.) a calf has been tethered to the front legs of a cow whose back legs have been bound while the herdsman milks [fig. 2.2] (Amoroso & Jewell 1963: pl.XIVc). A wall painting from the main chamber of tomb 15, Beni Hasan (c. 2000 BC.) shows a calf and child suckling a cow while the herdsman appears to be stimulating the perineal region [No. 168] (Newberry:1894:pl.VII). This scene is described by Amoroso and Jewell as a depiction of the *...first stage in*

conditioning (1963:133, pl. XIVd). The association between suckling and milking is emphasised by the juxtaposing of the images of a cow suckling a calf and a figure milking a cow in the presence of her tethered calf from the 5th Dynasty tomb chapel of the Mastaba of Ptah-hotep II and Akhet-hotep, Saqqara [fig. 2.3] (Davies 1901:16, pl. XVII).

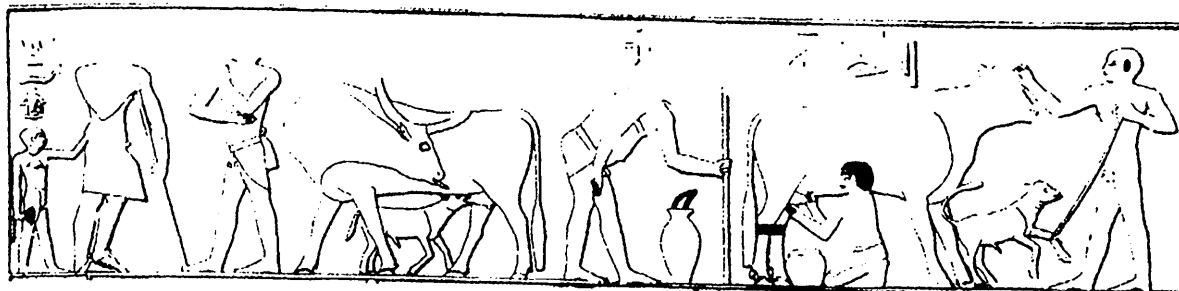


Fig. 2.3

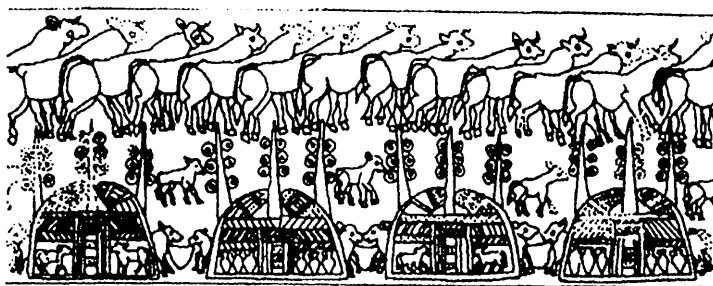
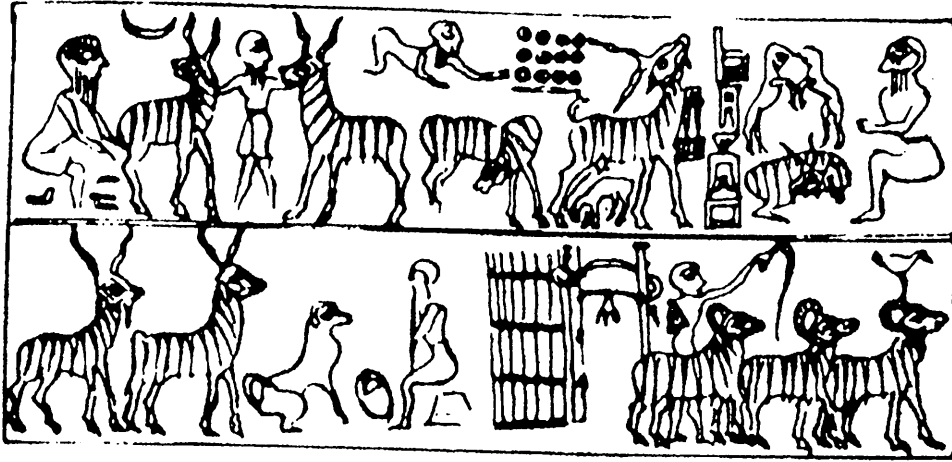


Fig. 2.4

Milking was also represented in Near Eastern art. A cylinder seal from Iraq (Uruk period, late 4th millennium) provides us with a particularly good illustration of how calves were utilised in the production of milk. [fig. 2.4] (Sherratt 1981:fig 10.12). The field of decoration is divided into two registers. A row of cows are represented in the upper register while in the lower register calves, separated from their mothers, are represented in reed-built byres. This would cause a build up of milk in the cows, making them more amenable to milking (Davis 1987:160). On an inlaid frieze from the temple of Nim Hursag at El Ubeid, Iraq, Early Dynastic III period (mid 3rd millennium) there are scenes of both milking and figures processing milk [No. 169] (Davis 1987:161).²³

The squatting figures hold vessels between their knees as they milk the cows from behind. According to Amoroso and Jewell they are represented blowing into the vaginas of the cows with tubes (1963:133). The same milking stance is evident on other Mesopotamian cylinder seals and is still employed by some Mesopotamian tribes today [fig. 2.5] (Amoroso & Jewell 1963:133, pl. XVb; Collon 1987:148, fig. 626).



Motive Power

Cattle were probably the first large animals to be exploited as a source of motive power (Davis 1987:162). The most important spheres in which cattle were used as sources of traction were agriculture (for example ploughing and threshing) and transportation (both of people and goods).

Evidence for the use and development of the plough and cart is first seen in Mesopotamian pictograms and cylinder seals dating from the fourth millennium (Sherratt 1981:266). Third millennium representations include a Southern Mesopotamian cylinder seal (2300 BC) on which a bull or ox is represented pulling a two-handled plough with a sowing funnel (Davis 1987:fig. 7.11).²⁴ Models of yoked cattle have been found at Bytyn, Poland (3500 BC) (Davis 1987:164) while plough marks from as early as the fourth millennium have been identified in Northern Europe, India, China and Egypt (Sherratt 1981:266-271; Davis 1987:164).²⁵ In the mid to late 2nd millennium Ugaritic text (*KTU* 1.14v 7-13) of *The Story of King Keret* there is a description of how the king is kept awake by both the ... *bellowing of his bulls* and the ... *lowing of his plough-oxen*.

The earliest evidence of the use of carts are Mesopotamian pictograms dated to the early fourth millennium (Sherratt 1981:263). Further evidence from this region includes Early Dynastic cart burials and representations of carts, including clay models (Sherratt 1981:263). The use of the cart seems to have spread from Mesopotamia through Europe and India during the third millennium (Sherratt 1981:264-266).

During the fourth millennium equids and camels were domesticated. Unlike cattle, which can be exploited in a wide variety of ways, equids were kept primarily as a source of motive

power. The Bronze Age faunal remains seem to suggest that as their role was limited, less animals were kept. Davis however warns against taking the scarcity of faunal evidence of equids at face value and underestimating the importance of these animals to the development of Bronze Age society (1987:164). The advantage of horses over cattle is their speed. This is emphasised by their early exploitation in warfare (Davis 1987:164).²⁶ Representations from Giv'atayim, Israel of donkeys and cattle serving as pack animals date from as early as the Chalcolithic (3660-2400 BC) (Davis 1987:165, fig. 7.13) and an Early Bronze Age III model of a donkey carrying baskets has been identified from Cyprus (Davis:1987:165; Sherratt 1981:274, fig. 10.11).

Diverse Production Systems and Priorities

The secondary products revolution represents not only an increase in the range of products but also the development of different production systems and priorities. Just as today in Southern Greece, some Bronze Age communities would have kept cattle primarily for traction (Reese 1995:188-189).²⁷ Others would have reared cattle primarily for milk or beef. The identification of production priorities from the faunal assemblage is difficult and demands detailed study of both the bones and the context (Halstead 1987).

It can prove even harder to identify and establish the precise nature of the relationship between man and beast when the motivation for the rearing of cattle is not the production of quantifiable commodities but rather the fulfilment of *...social, cultural and religious requirements and obligations* (Wilson 1995:11). The potential importance of such concerns is evident from Indian cattle taboos (Thomas 1989:111) and the importance of cattle as providers of *...status or prestige within the immediate community* identified by Wilson in the smallholding farming communities of the Tropics (1995:11).²⁸ One should therefore not underestimate these factors when determining the motivation behind the adoption of diverse production systems and priorities.

Crete: Background

Although no certain evidence has been discovered of human activity on Crete prior to the Neolithic period (J. Evans²⁹ 1964a:58; Cherry 1990:158-159; Broodbank & Strasser 1991:234-5) its position in the Aegean, visible from the southernmost Cyclades, suggests that it was known of and was probably visited prior to colonisation (Broodbank & Strasser 1991:235-236). The evidence for colonisation and early occupation of Crete is limited to Knossos, the only Aceramic and Early Neolithic site so far detected.

The colonists imported either the knowledge or the components of a highly developed agriculturally based economy, suggesting that they came from an established and organised society. Although the question of origin has not been adequately answered the weight of evidence implies an Anatolian source. Evidence such as the bread wheat (*Triticum aestivum*) found at Knossos of a type not attested in Northern Greece during this period but discovered at Can Hasan III and Çatal Hüyük (J. Evans 1964a:59; Mellaart 1975:97-98; Broodbank and Strasser 1991:237)³⁰ and animals of types identified in Near Eastern assemblages (Broodbank & Strasser 1991:23)³¹, is frequently cited in support of this argument. Parallels have also been drawn between the building materials (Mellaart 1970:3-4; J. Evans 1994:5; Renfrew 1996:9) and features (J. Evans 1964:47)³² and the pottery types of Crete and Anatolia (Pendlebury 1939:42; Furness 1953:134; J. Evans 1968:273-5). The evidence of parallels in pottery types has been refuted on the basis of radiocarbon 14 dates (J. Evans 1968:272-274; Strasser & Broodbank 1991:237) and although the weight of evidence appears to be in favour of a Southwest Anatolia origin (Pendlebury 1939:42; J. Evans 1964a:58-59; 1994:5; Strasser & Broodbank 1991:237), the possibility of a West/Central Aegean origin cannot be completely dismissed (Broodbank & Strasser 1991:237). The question of where the colonists came from remains important. The answer might provide us with useful comparative material, a wider context and possibly insights into aspects of Aceramic and Early Neolithic Knossian society including religious practices and social structures, areas of which the Cretan archaeological assemblage can provide only fragmentary glimpses of.

Evans demonstrated Neolithic occupation of the hill of Kephala (1921:32-55). Further soundings in the west and central courts of the Minoan palace during 1957-60³³ and 1969-70 by J. Evans (1964a; 1964b; 1968; 1971; 1994) produced further evidence of the earliest settlement on Crete; the earliest strata being dated to the late 8th to early 7th millennia.³⁴ J. Evans identified ten strata at Knossos (1994: table 1). Stratum X represents an Aceramic (AcN) period of settlement.³⁵ Strata IX - V are categorised as Early Neolithic I (EN I) and stratum IV as Early Neolithic II (EN II).³⁶ The nature of the Middle Neolithic (MN - stratum III) and the Late Neolithic (LN - strata II - I) evidence prevents detailed analysis of the size and form of the settlement during these periods. Much of stratum I and parts of II were destroyed when the ground was levelled off for subsequent building schemes (Evans 1921:35; J. Evans 1964a:57; 1964b:138, 194; 1971:114-116; 1994:2, 16, 19). J. Evans (1994:18-19) suggests that this was a period of continued growth or at least stability which extended into the Early Bronze Age.³⁷

The earliest evidence of Neolithic occupation of Crete outside Knossos dates to the MN period

and consists of surface finds: tools, shards of pottery and small-scale habitation sites ranging from simple houses to caves and rock shelters (Alexiou 1954; Weinberg 1970:617; Sakellarakis 1973:135).

By the Late Neolithic/Early Bronze Age there is evidence of occupation from all regions of the island, inland, coastal and even from small islands surrounding Crete (Hutchinson 1962:51; Sakellarakis 1973:135; Watrous 1982:9-10; Branigan 1995; Cosmopoulos 1995; Halstead 1995; Vagnetti 1996:31). Although sparse, the evidence of small villages and hamlets (Sakellarakis 1973:135) is valuable in creating a fuller picture than the insubstantial evidence provided by Knossos during this period. It is from the LN/EBA that the first clear evidence of both spiritual (Dickinson 1994:210, 212) and economic centres is derived (Hutchinson 1962:51; Sakellarakis 1973:136).

It has been suggested that during the EM I period there was a wave of immigration from Anatolia or the Levant, affecting mainly the north coast of Crete (Glotz 1925:32; Pendlebury 1939:47, 53). There are striking changes in the pottery but these have not been successfully associated with specific Near Eastern sites and Branigan (1970:196-200) argues that the changes between LN-EM are not sufficient to indicate extensive immigration. Hood suggests that small groups of immigrants settled in the areas around Phaistos and, slightly later, Knossos (1990:154, 157) and mentions evidence of Cycladic settlers during the EM period (Hood:1990:157; Schofield 1996:45-6). The diversity of material from the LN site of Nerokourou, southeast of Khania, suggests that Crete also had links with other regions by this period, particularly the southeast Aegean. The evidence of EM immigration should be considered within the context of long term interrelations rather than as an isolated and sudden influx (Renfrew 1996:9-10; Vagnetti 1996:34-39).

The appearance of monumental and administrative buildings at Palaikastro and Knossos during EM II/III (Branigan 1995:34; Cosmopoulos 1995:28) has been cited as evidence of the emergence of a controlling elite (Warren 1972:48-50, fig. 20, pl. 17; Cosmopoulos 1995:30-31; Halstead 1995:19; Whitelaw 1995:324). The composition and status of such an elite and the spheres in which they operated is far from clear. The range of EM grave goods found at Cretan tomb sites reveals a distinction between wealthy and poor burials (Cosmopoulos 1995:24-25) but it is not possible to determine whether the variation is a reflection of wealth, political or religious. Population increase is deduced from the continued growth of both small communities and large nucleated centres although the evident

establishment and abandonment of numerous communities throughout the period emphasises that populations were not static (Branigan 1995:35). There is indeed much evidence of interconnections between the regions of Crete (Wilson 1994:43) and links with areas beyond the island during the EM period. The evidence consists of the extensive dispersal of a wide range of island-made products, the appearance of imported objects and materials (Cadogan 1987:72; Wilson 1994:39)³⁸ and clear evidence of ritual and burial centres suggesting the development of common beliefs (Branigan 1995:35-38).

Following the EM development of monumental architecture, between MM I - II major palaces³⁹ were built at Knossos, Phaistos and Mallia (Evans 1921-1936; Pernier 1935; Pernier & Banti 1951; MacGillivray 1984; Warren 1987). These served as regional administrative, economic and religious centres (Cadogan 1987; Warren 1987; MacGillivray 1994:46;). Dabney describes the establishment of such centres as indicative of a society where land was increasingly owned and labour controlled by an elite (1995:44). Such a system necessitates a proportion of the populace being employed in waged labour and craft production, obtaining food in payment or through exchange. This hypothesis is supported by the growth in number and range of industries throughout Crete (Cadogan 1987:71; Chrysoulaki & Platon 1987:81; Warren 1987:50) and evidence that the palaces acted as regional centres for storage and distribution (Warren 1987:72; Dabney 1995:44). The increasing quantity and range of imported material suggests expanding trade links (Warren 1987:71-2). During MM I-II there is also evidence of a large increase in the number and range of ritual centres, including caves, purpose-built shrines, and funerary sites (Dickinson 1994:264-268).

Following seismic shocks, between MM III - LM IB the old palaces were rebuilt and enlarged and new palaces, large country houses and villas were established (Cadogan 1980:37; Dickinson 1994:fig. 4.22; Walberg 1994:49-51). Structurally (particularly in terms of storage provision) many of the houses and villas incorporated architectural features evident in the palaces which has led some to conclude that they served similar functions albeit on a smaller scale (Dabney 1995:46; Walberg 1994:51-2).⁴⁰ The degree to which these villas represent regional administration has been debated. Rather than acting as autonomous centres for religious, administrative and production activity it has been argued that the villas were a part of an extensive yet unified system controlled by the palaces (Walberg 1994:53). The high level of administrative and production activity and storage evident at some sites may however indicate regional or even private administration and enterprise (Shoep 1996:83). In terms of ceremony, the New Palace Period appears to represent a decline in the

importance of the caves, peak and open air sanctuaries. This is possibly a result of the palaces, houses and villas becoming, to a greater extent, ceremonial centres (Dickinson 1994:260). Old burial sites were used less frequently and a number of new sites were established (Dickinson 1994:214). Overall, an increase in the size and number of settlements suggests a growing population while links between the regions of Crete and overseas connections continued to develop (Cadogan 1980:37; Schofield 1996:45-7).

Many believe that by the end of the LM I period, Knossos had become the home of a strong, centralised power base, influential throughout the island (Hallager & Hallager 1995:551) while Weingarten argues that by LM IB Crete consisted of four administrative regions, with Knossos, Ayia Triada, Kato Zakros and Kania serving as administrative centres (1990:110-112). During LM IB there is evidence of widespread destruction, all the palaces except Knossos and most of the villas being destroyed. Strong evidence suggests that this was followed by a period of Mycenaean control of the island (Popham 1994:89, 93; Renfrew 1996:11-14; Dickinson 1996). This has been described by some as the end of the Palatial Cretan civilisation (Cadogan 1980:37). Others have argued that during the course of the LM II – IIIA1 period there is evidence that the economy was recovering (Popham 1994:89) and that a pyramidal bureaucracy was established with Knossos at the apex and other centres such as Ayia Triada, Kania and Phaistos serving as *second-order centres* (Weingarten 1990:112-13, n. 49; Popham 1994:90). The Linear B based administrative system has much in common with subsequent mainland developments and Knossos *...might have been the place where the Mycenaean administrative system originated under Minoan tutelage* (Palaima 1990:99; 1992:467). There are also changes in funerary practices including the introduction of the Mycenaean chamber tomb and iconographical changes such as an increase in heraldic and militaristic imagery and the introduction of new vessel shapes (Popham 1994:92-94).

There is some controversy as to when Knossos was finally destroyed. Evans believed that the palace was abandoned at the end of LM II and partially re-occupied during the LMIIIA:2 – LMIIIB period (1928-35), an interpretation largely supported by Popham who differs only from Evans in his view that the palace was originally abandoned during LM IIIA:1-2 rather than at the end of LM II (1994). In contrast Palmer argued that the palace was abandoned at the end of LM III B but was partially re-occupied as late as LM IIIC (1963).⁴¹

LM IIIA2- IIIB has been described by some as the post-palatial period (Hallager 1988:115), a period of decentralisation. Recently, Kania has provided evidence of architectural

expansion and an increase in the population during LM IIIA –IIIC, suggesting that the power base or capital of the island may have shifted to this location (Hallager 1988:116-120; Popham 1994:90). Hallager describes evidence of both. The architectural style and artefacts found at Khania further suggest that this was a period of continued Mycenaean presence (Hallager 1988:116-118). Driessen and Farnoux further suggest that by LM IIIB areas of Crete beyond Knossos and Khania had become Mycenaeanised (1994:55). This period also sees a resurgence of contacts between Crete and other regions of the Eastern Mediterranean (Hallager 1988:119; Popham 1994:90).

At the end of LM IIIB there is evidence of widespread destruction and abandonment of sites and the establishment of what are described as refuge sites, which offer natural protection (Popham 1994:92). Haggis and Nowicki suggest that the LM III C sites of Khalasmeno and Katalimata may represent a *dual settlement* (1993:334). Khalasmeno, situated on a low hill, surrounded by good agricultural land and Katalimata, situated on several ledges of the gorge of Kha, well camouflaged, inaccessible and easily defensible. Katalimata possibly served as a refuge site for both men and animals during times when the community of Khalasmeno was under threat. Haggis and Nowicki further conclude that the LM IIIB – IIIC period sees a resurgence of single or nucleated sites interacting on a subsistence level in areas with good agricultural diversity and potential (1993:335). During the LM IIIB – IIIC Minoan symbols including the double axe and horns of consecration continue to be prominent in iconography (Coulson, Day & Gesell 1986:386). Although this may represent a degree of continuity in religion and ritual, it need not necessarily indicate that the meaning of the images or their function remained exactly the same throughout the Bronze Age and Iron Age.

The Archaeological Evidence of Cattle on Crete

The following is a chronological survey of the faunal remains and their contexts. Due to the volume and range of information the evidence will be divided into four sections. The first will concentrate on evidence for the living animal and its role in the development of Cretan agriculture. The second section will focus on the transition of cattle from the live to depositional context as indicated by specific contexts, associated objects, the treatment of bones and evidence for consumption and ritual. The third section will consider the evidence for the utilisation of fat, skin, bones and horns. Finally, the references to cattle in Linear A and B texts will be discussed.

The Origins and Development of Cretan Agriculture

As the only Neolithic site where the time span and size of the assemblage is sufficient to allow

detailed faunal analysis, Knossos will serve as the focus of the Neolithic period. Animal bones were found in all Neolithic levels at Knossos (J. Evans 1964a) but only those excavated during the 1957-60 seasons from strata X -V (AcN - EN I) have been published in detail (Jarman & Jarman 1968:241-264). The bones of the MN - LN have only been discussed in general terms (Gamble 1978:751 fig. 2; Jarman *et al.* 1982:148; Winder 1986, 1991; Broodbank 1992:61-62; Whitelaw 1992:232; J. Evans 1994:15). Such discussions tend to be cautious and speculative as a result of both limited data and depositional factors (Winder 1986:31-37; Broodbank 1992:62; Whitelaw 1992:232).

The colonisation of Crete before the Cyclades⁴² would suggest a deliberate choice based on prior knowledge of the Cretan climate and landscape. In particular, which part of the island offered favourable conditions for agriculture (Jarman *et al.* 1982:146-148; Broodbank & Strasser 1991). It has been estimated that good arable land constitutes less than 7% of the Cretan landscape (Jarman *et al.* 1982:147); Knossos, situated at the edge of one of the largest areas, was made all the more desirable by the presence of steep grazing to the north and south and one of Crete's few permanent streams (Roberts 1979:240; Jarman *et al.* 1982:146-7, fig. 53).

Analysis of the floral and faunal remains have led some to conclude that the earliest settlers brought with them not just the knowledge of a mixed farming economy but also the components (Broodbank & Strasser 1991) (see above).

The AcN - EN I assemblage consists mainly of sheep and goats,⁴³ pigs and cattle.⁴⁴ The bones represent a cross section of the skeletal points with the notable omission of cranial elements considered too fragmentary to be of value to the survey and horn cores of which only one example of cattle and none of sheep were discovered (Jarman & Jarman 1968:241-242). Jarman and Jarman (1968:241-264) divided the AcN - EN I assemblage into three periods; AcN (stratum X), Early Neolithic Ia (strata IX-VIII) and Early Neolithic Ib (strata VII-V). Through comparison of bone sizes with other assemblages, both domestic and wild, from European and Near Eastern sites and, in the case of sheep, identification of a decrease in the mean size between AcN - EN Ib and a decrease in variability of sizes in the bones between EN Ia and EN Ib, Jarman and Jarman concluded that the assemblage represents imported domesticates (1968:255, 257-8). Winder believes the AcN faunal evidence to be inconclusive as it relies on the insupportable *assumption* that the remains are of domesticated animals, smaller than a wild, non-Cretan ancestor (1986:109-145; 1991:44-46). Considering that island cattle are often smaller than continental stock, it is possible that the remains represent endemic wild animals. Indeed, Gamble (1980:288) states that

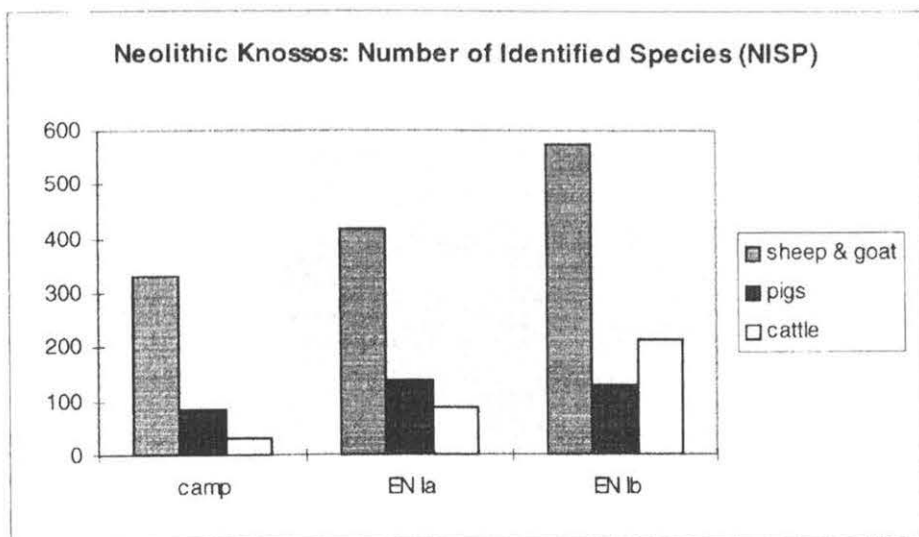
Jarman and Jarman claimed to have identified a few bones in the AcN and later levels at Knossos that came near to the expected size of *Bos primigenius*; a contradiction of their published assertion that the AcN specimens ...*lie outside the range of wild cattle, but well inside that of large domestic cattle* (Jarman & Jarman 1968:251). If we are to accept the hypothesis that a decrease in size is an indication of animal domestication then it is in the transition from AcN to EN Ia that evidence of domestication occurs (Jarman & Jarman 1968:255, 257-8; Winder 1986:111,114).

Mortality profiles based on the age at death determined from bone and teeth⁴⁵ development are often used as an indication of domestication and specific exploitation. Although the evidence from this assemblage is limited Jarman and Jarman have argued that in the case of sheep, goats and pigs the age structures support the theory that they were domesticated throughout (1968:245, 247, 252-253, 255-256, tables 3-8). This is supported by Davis (1987:fig. 7.5) who claims that over 60% of the goats attested in the Neolithic Knossian assemblage were less than 2 years, comparable to other Greek and Near Eastern Neolithic sites. Between 12-24 months sheep reach their optimum size (Sakellarakis 1973:131) and if the primary motivation for keeping them is meat, this is the period when one would expect to see the highest concentration of slaughter.

The quantity of AcN cattle bones is too small to draw any conclusions while the EN Ia and Ib assemblages indicate little about the specific killing ranges as in the majority of cases only minimum killing ages can be ascertained (Jarman & Jarman 1968:252, 254, 256). Winder (1986: 113) suggests that the mortality profiles have received too little analysis and as there is evidence that the targeting of ages and sexes was not unique to farmers but also practised by some hunters (Speth 1983:2-3) it can not be used as evidence to support the belief that the assemblage represents domestic animals.

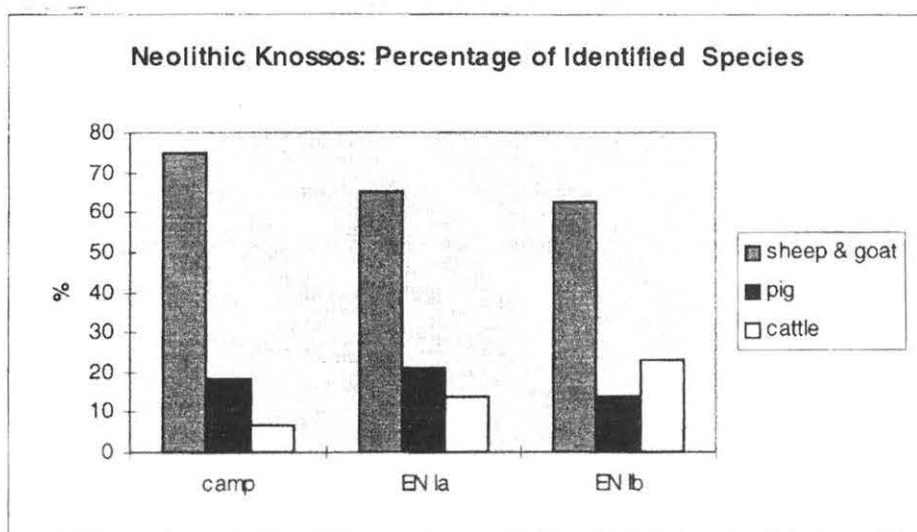
The fragmentary nature and size of the assemblage makes the establishment of sex ratios impossible (Jarman & Jarman 1968:260).

Throughout AcN - EN Ib there is an increase in the numbers of sheep, goat and cattle bones while between EN Ia - EN Ib there is a slight decrease in the quantity of pig bones [Graph 1].⁴⁶



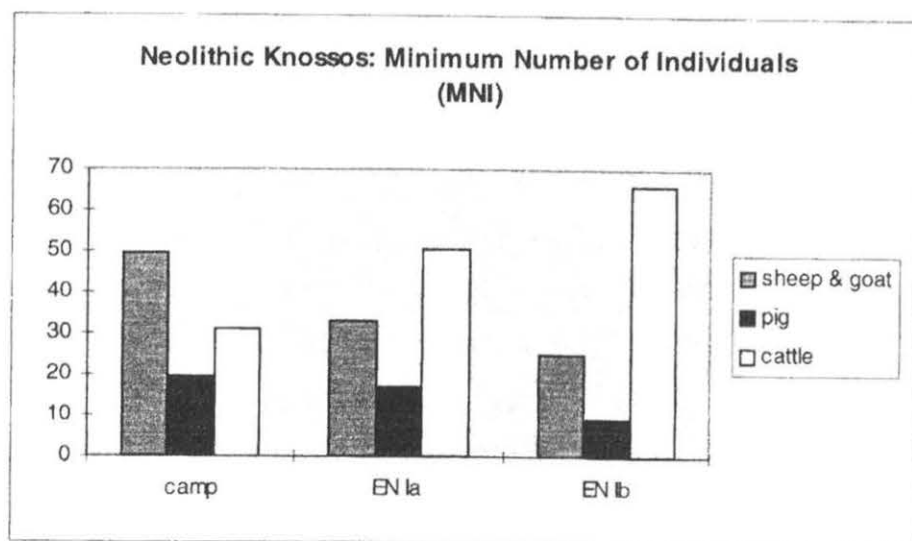
Graph 1.

Sheep and goats remain the most numerous throughout; pigs the second until EN Ib when cattle become more so. In terms of percentages of different species represented during the three periods there is an overall decrease in sheep and goats and an increase in cattle [Graph 2].



Graph 2.

The percentage of pig bones varies the least (6.9%) while sheep and goat bones decrease by 12.3% and cattle increase by 16.6%. The importance of the individual animals as sources of food is an important factor [Graph 3].



Graph 3.

The evidence suggests that over the whole period there is a slight decline in the importance of the pig and a striking increase in that of cattle which by EN Ia became the primary source of meat.⁴⁷

If Jarman and Jarman's (1968) assertion that the faunal remains represent domesticated, imported animals is accepted then the role of individual species in the earliest stages of colonisation is an important consideration. The ability of individual species to flourish in environments different from their native habitats is a major factor in the development of agricultural practices. The development of animal husbandry practices to cater for specific human requirements as well as animal welfare is also relevant (Halstead 1981:322).

The low percentage of cattle bones in the AcN assemblage has been accounted for in a number of ways. Jarman and Jarman (1968: 261) argue that the environment of Crete was initially more suited to sheep, goats and pigs (J. Evans 1968:270), while Jarman *et al.* (1982:148) suggest that the greater difficulty in transporting cattle may account for the low number of bones in the earliest levels.⁴⁸ The former necessitates consideration of the requirements of the individual species. In husbandry terms pigs would have required little attention as they are scavengers, able to feed in the forested areas surrounding Knossos and from human refuse without requiring additional nourishment (Vickery 1936:64; Halstead 1981:323; Trantalidou 1989:394).⁴⁹ Sheep and cattle graze on open pasture while goats are suited to cope with a sparser, steeper terrain. Pigs, sheep and goats mature more quickly than cattle (Bökönyi 1976:19) while pigs also have a much higher rate of reproduction, resulting in an overall higher rate of natural increase (Jarman *et al.* 1982:148) than sheep, goats and cattle.⁵⁰ Pigs therefore provide a relatively plentiful source of meat without proving a drain

on resources in terms of either husbandry or nutritional requirements. The relatively high level exploitation of pigs by small and newly established agriculturally based economies is, not surprisingly, widely attested.⁵¹

Herding and containment are fundamental aspects of ruminant husbandry. Mobile pastoralism would have been essential on Crete as the shortage of summer grazing in the lowlands would have driven the herds inland in search of pasture (Halstead 1981:310; Jarman *et al.* 1982: 146-7).⁵² The process of herding cattle demands a far greater level of manpower than sheep and goats. During the AcN priority would have been given to establishing crops (the main source of food) and the quickly maturing less demanding ruminants.

A number of factors led to deforestation in the area of EN Knossos.⁵³ These include man's use of wood for buildings and fuel, a need for leafy branches for fodder,⁵⁴ the clearing of land for pasture, increased crop production (Halstead 1981:324)⁵⁵ and the grazing and scavenging activities of domesticated animals, especially pigs, which prevent the growth of new trees. The environmental changes resulting from both direct and indirect human activity therefore led to an increase in open land more suited to sheep, goats and cattle than pigs (J. Evans 1994:10).⁵⁶ There are in fact economic advantages to grazing cattle since in terms of body weight they require less food, will eat rougher pasture than sheep⁵⁷ and due to their height can browse on the leafy branches of bushes and trees. (Bell 1971:90-1; Clutton-Brock & Harvey 1978:191-2; Halstead 1981:323-4).

The evidence suggests that the inhabitants of Knossos relied to a great extent on the pig as a source of meat during the early period of the settlement. Once they had become established more resources were released to be employed in the more demanding longer term investment of cattle rearing. In terms of the quantity and range of products and resources provided, cattle represent a far greater return than the pig (Trantalidou 1989:393) or indeed any other animal (Clutton-Brock 1987:62).⁵⁸

The MN - LN remains have not been published although the material has been discussed in general terms (Gamble 1978:751 fig. 2; Jarman *et al.* 1982:148; Winder 1986; 1991; Broodbank 1992:61-62; Whitelaw 1992:232; J. Evans 1994:15;).⁵⁹ The increase in cattle bones between AcN -EN Ib continued, reaching a peak of c. 50% of the 14000 identified bones dated to the MN period. This was followed by a marked decrease during the LN (Jarman *et al.* 1982:148). Several hypotheses have been proposed. Jarman *et al.* (1982:148)

suggest that once the settlement had become established, the colonists, driven by a preference for beef, concentrated on cattle rearing and as a result of the difficulty involved in cattle farming in this environment reverted, during the LN, to concentrating on sheep and goats. This presupposes that the environment is not conducive to the rearing of cattle whereas the evidence suggests that Crete and in particular Knossos has a lot to recommend it as a cattle breeding region (Jarman *et al.* 1982:148). Even today, Crete is one of the highest density cattle breeding centres in the Aegean (Renfrew 1972:276 fig. 15.4; Broodbank 1992:61).⁶⁰ It has further been suggested that even before the Bronze Age, Knossos may have become *...the pinnacle of an economic, commercial and political hierarchy* and that the faunal remains represent an atypical assemblage rather than an accurate indication of MN - LN Cretan society, possibly indicative of specialisation (Jarman *et al.* 1982:148).⁶¹ Broodbank (1992:62) suggests that the overall predominance of sheep and goats may have continued throughout the period and that the MN increase of cattle bones in a settlement context may be the result of a rise in the social or religious value of cattle resulting in an increase in slaughter, sacrifice, butchering, primary and secondary usage and discard within the settlement context. If this is the case, the decrease in the number of cattle bones found at Knossos during the LN may reflect further changes in the status and role of cattle in society.

It is possible that building activity during the EM period would have not only disturbed the LN-EM strata but also have caused taphonomic or microenvironmental changes (Jarman *et al.* 1982:148; Winder 1991:48). Jarman *et al.* conclude that there were probably a number of *...economic or ecological factors underlying the apparent anomalous importance of cattle, but the data may never be sufficiently satisfactory to demonstrate this* (1982:148).

From the MN onwards there is evidence of small-scale occupation sites in other regions of Crete. These include isolated houses such as those at Magasa (Hutchinson 1962:51; Sakellarakis 1973:136) and Katsambas (Alexiou 1954; Weinberg 1970:617; Sakellarakis 1973:135) and inland caves (Rutkowski & Nowicki 1996). Transhumant activity has been associated with a Neolithic well at Kastelli Phournes (Manteli 1992) probably used by herders who took advantage of upland spring and summer grazing (Manteli 1992:114-115; Rutkowski & Nowicki 1996).⁶²

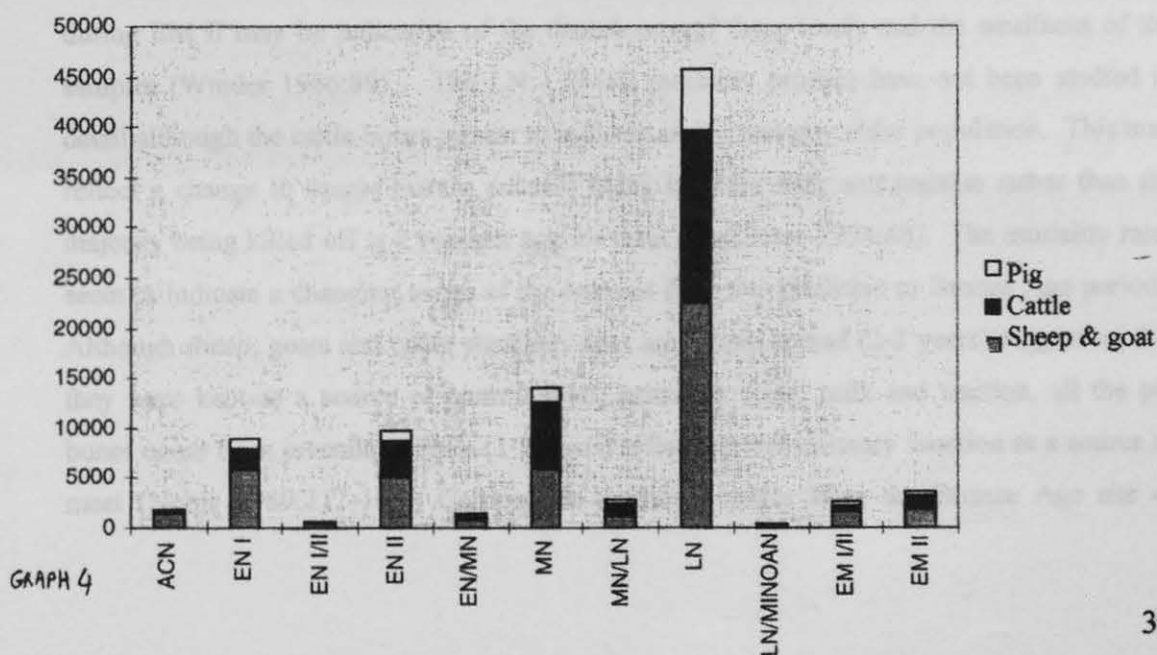
By the Late Neolithic there is faunal evidence from a number of sites on Crete and although few have been studied in detail, they serve at least as an indication of the range and distribution of sites at which animals were exploited as well as an indication of the extent to which Knossos is typical of settlements throughout the island. The material and faunal remains from the two- to three-

roomed MN - LN house at Katsambas are indeed similar in type to those of Knossos (Alexiou 1953:306-307; Weinberg 1970:617), the refuge in the yard including the bones of goat, sheep and cattle (Alexiou 1953:307; Sakellarakis 1973:135). The LN settlement at Phaistos, like Knossos, provides evidence of more than one structure, representative of a number of households which have been interpreted as indicating that Neolithic Phaistos was home to a community of farmers, hunters and fishermen (Pernier 1935:87). Certainly, the position of Phaistos on the fertile lowland plain of Mesara would have provided its inhabitants with good arable and grazing land (Jarman *et al.* 1982:148). The faunal assemblage includes the bones of domestic sheep and ox, wild boar, wild goat, hare, fish, large birds, mollusc shells and whale vertebrae, indicative of farming, hunting and fishing activity (Mosso 1910:68; Pernier 1935:87-88).⁶³

Rutkowski and Nowicki (1996) have identified twenty-one caves exhibiting signs of Neolithic and/or sub-Neolithic usage focused on chambers towards the front of the grottoes. The most numerous elements in the assemblages are pottery, tools and animal bones suggesting that during this period the caves were inhabited, albeit on a permanent or semi-permanent basis, possibly in connection with seasonal herding or hunting activity.⁶⁴

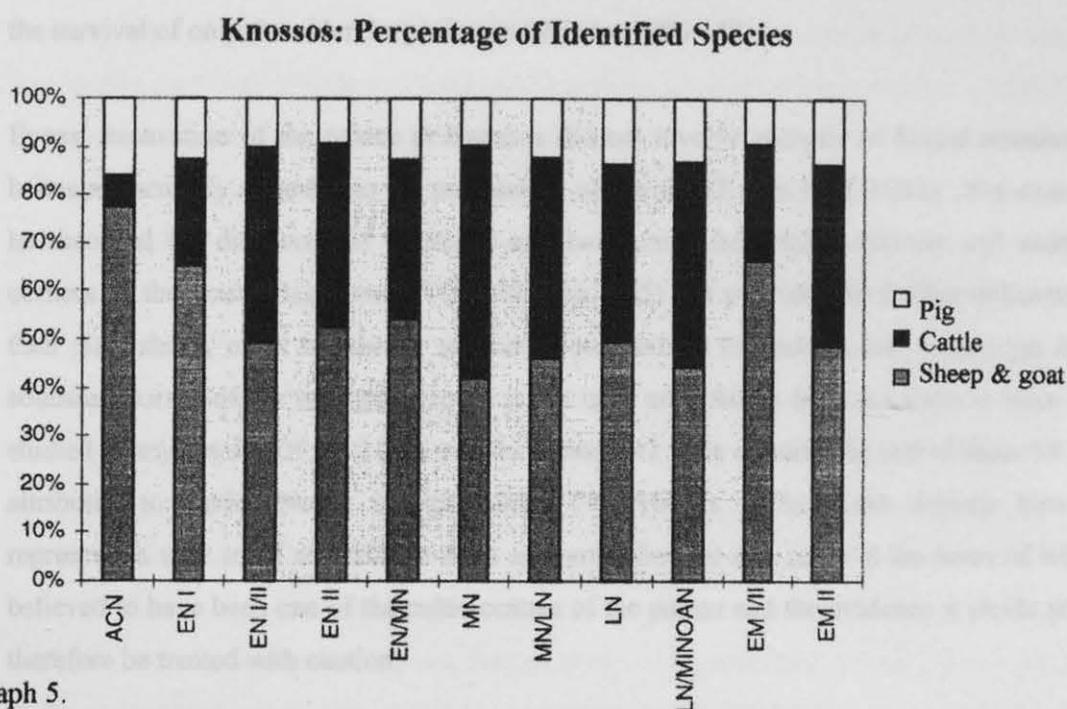
The three final phases of bones from J. Evans' excavations at Knossos were classified as LN/Minoan, EM I/II and EM II (Winder 1986:83). Although unpublished, these bones have been discussed by Winder (1986:83-4) who emphasised that the disturbance caused by subsequent building activity demands that this section of the assemblage be studied with extreme caution. Indeed these three phases appear, at face value, to indicate extreme and sudden changes in the faunal assemblage [Graph 4].

Knossos: Number of Identified Species (NISP)



Between ACN - MN/LN the total number of recorded sheep, goat, pig and cattle bones was 39724; between LN/Minoan - EM II only 6685. A distinct LN phase was identified from which 45632 bones were recovered [Graph 4]. This reflects either a sudden increase and equally rapid decline in the numbers of animals kept or calls into doubt the reliability of the later phase assemblages as indicators of the quantities of animals exploited during the LN - EM period.

In terms of percentages however the assemblage shows limited deviation in the proportions of animals represented throughout (Winder 1986:89, table 4) [Graph 5].



Graph 5.

The apparent decrease in the percentages of cattle and pigs during EM I/II and increase during EM II may be indicative of the disturbance of these levels and the smallness of the samples (Winder 1986:89). The LN - EM II mortality profiles have not been studied in detail although the cattle bones appear to indicate an increasingly older population. This may reflect a change in usage; mature animals being kept for milk and traction rather than the majority being killed off at a younger age for meat (Dickinson 1994:48). The mortality rates seem to indicate a changing usage of the animals from the Neolithic to Bronze Age period. Although sheep, goats and cattle slaughter ages are evenly spread (2-3 years) suggesting that they were kept as a source of commodities, primarily wool, milk and traction, all the pig bones come from juvenile animals (1-2 years) reflecting their primary function as a source of meat (Nobis 1989:217-18). Comparable evidence comes from the Bronze Age site of

meat (Nobis 1989:217-18). Comparable evidence comes from the Bronze Age site of Akrotiri, Thera where the rarity of juvenile bones compared with those of adults has been interpreted as indicating that cattle were primarily used as draught animals, with milk and meat being of secondary importance (Gamble 1978:749-750). Similarly, through analysis of the faunal samples from the island of Chios, Clutton-Brock concluded that although a third to a quarter of the cattle bones represent immature animals, in contrast with the pig, sheep/goat and deer bones old cattle are numerous, rather than rare (1981:693). She suggests that although some calves were killed for food others were kept until adulthood for draught and threshing and only killed off for food and hides when they were old.⁶⁵ It is also possible in the case of the Knossian LN/EM assemblage that changes in taphonomic factors resulted in the survival of only the older, larger bones (Winder 1986:143).

Evans' excavation of the palace at Knossos did not involve analysis of faunal remains and bones are scarcely recorded in his publication of the site (Evans:1921-1936). For example, he recorded the discovery of ox *heads* and horn cores from the northwest and southeast corners of the South Basement (1928: 302, fig. 175) but provides no further indication of their size, shape, exact context or state of preservation. Deposit K. 04, from a pit in the southeast corner of the west pillar room is the only assemblage from Knossos to have been studied in any detail. Of the 375 bones recovered 142 were identifiable and of these 54 were attributed to cattle (Nobis 1989:216-219; 1990:16-19). The K.04 deposit however, represents a very small assemblage from an unstratified pit in a room at the heart of what is believed to have been one of the cultic centres of the palace and the evidence it yields should therefore be treated with caution.

At two houses in the vicinity of the palace, cattle bones and horncores were identified. At the House of the Sacred Bulls a bucranium was found in the corner of one of the rooms (Nobis 1990:17) while 20% (14) of the bones from the MM III-LM IA houses surrounding Knossos have been attributed to cattle (Reese *et al.* 1995:189). 363 cattle bones (12.2% of the total assemblage) were recovered from the Unexplored Mansion. Eleven of these date to LM IA (7.4%), 330 to LM II (12.4%), and 22 to LM IIIA2 (12.1%) (Reese *et al.* 1995:189). Eleven cattle bones, representing some 6.3% of the assemblage, were recovered from the Minoan levels under the Sanctuary of Demeter, Knossos (Jarman 1973:178).

Faunal remains are attested at large and small-scale Minoan settlements throughout Crete and at the few sites where the assemblages have been recorded the composition, goat, sheep and

to a lesser extent cattle and pigs, appears the norm. At EM II Myrtos 90.3% of the assemblage represent sheep and goat, 8.2% pig and 1.5% cattle (Jarman 1972:318) and at MM - LM III Kommos the sheep and goats account for 70.7 % of the assemblage (Reese *et al.* 1995:170). Sheep, goats, pigs and cattle have also been identified in all levels of the MM-LM II site at Tyliossos (Hazzidakis 1921:76), with sheep bones the most numerous during the LM period (Reese *et al.* 1995:177).

The Development of Production and Exploitation Strategies

From the LN/EBA onwards the growing number of small villages, hamlets and isolated farmsteads on Crete provide evidence of the move to exploit marginal agricultural land (Cosmopoulos 1995; Branigan 1995; Halstead 1995). Crete's diverse environmental diversity provided farmers with specific problems and restrictions, often reflected in the faunal assemblage. For example, some Minoan assemblages such as that from EM I-II Debla do not include cattle bones. Considering the rocky altitude, poor access yet ready availability of rough grazing, specialisation in breeds suited to this environment would seem inevitable and indeed only sheep and goat bones were identified (Greig & Warren 1974:130-131). At MM - LM III Kommos the high percentage of sheep and goats and very small number of cattle bones probably reflects the community's adaptation of the agricultural system to take full advantage of the environment. Grazing is limited and rough and although unsuitable for large-scale cattle rearing, it is ideal for sheep and goats. The few cattle kept probably served primarily as a source of traction (Jarman 1972:319; Palaima 1992:466). The same also appears to have been the case at the Late Bronze Age to Early Iron Age site of Halasmenos. The assemblage consists of 555 bones and fragments including sheep, goat, pig, cattle, horse, donkey or mule, dog and small rodent. The largest group is the caprine bone while pigs (NISP 16) and cattle (NISP 5) occur less frequently (Snyder & Klippel 1994:92). Similarly at the LM IIIB – C sites of Vronda and Kastro, 70% of the bones from Vronda and 77.9% of those from Kastro are caprine (Klippel & Snyder 1991:180, table). Further analysis has shown that at both sites, sheep bones far outnumber those of goats. This correlates with the Linear B evidence for the large-scale exploitation of sheep during the LM period (see below) (Klippel & Snyder 1991:184). Only 5% of the bones from Vronda and 8.2% of bones from Kastro represent cattle (Klippel & Snyder 1991:180, table). Klippel and Snyder point out that the lower-level settlement of Vronda, surrounded by pasture and fruit and nut trees, would have provided a better environment for the rearing of grazing animals, in particular cattle, than the sparsely vegetated area around the higher site of Kastro (1991:181).

Equids were an important addition to the Bronze Age and possibly even LN Cretan agricultural

system (see below). At Knossos, ass/donkey and horse bones have been identified from as early as the LN period (Winder 1986:84; Cherry 1990:163; Reese *et al.* 1995:193). Fifty-two domestic horse bones were identified at the Unexplored Mansion and dated to LM II. Most were discovered in the Pillar Hall (Room H) (Reese *et al.* 1995:193). LMI domestic donkey or ass bones were recovered from Tylissos (Hazzidakis 1921:76). At Pyrgos a very small number of equid remains were recorded (Gamble 1979:23) while both ass and horse are attested at Khania and one equid bone identified at Palaikastro (Reese *et al.* 1995:193). The lower molar of a horse found at Kommos was dated to LM IIIA2-B (Reese *et al.* 1995:193). The equid bones from the LM IIIB – C sites of Vronta and Kastro represent 1% of the Vronta and 0.1% of the Kastro assemblages (Klippel and Snyder 1991:181).

Cretan Domestic, Wild and Feral Cattle?

Of the 375 bones recovered from Deposit K. 04, a pit in the southeast corner of the West Pillar Room, Knossos, 142 were identifiable and of these Nobis attributed 16 to *Bos primigenius* and crossbred cattle and 38 to domestic cattle (1989:216-219; 1990:16-19). Nobis (1989:216-17, tab. 1) also identified both wild and domestic pigs. As, however, the majority of these bones represent domesticates (83.7%), Nobis suggests that domestic rather than wild animals were the primary source of protein (1989:217). Sixteen horn cores recovered by Evans from the corner of the Throne Room have been attributed by Nobis to large crossbred cattle (1990:17) while the bucranium found in the corner of a room at the House of the Sacred Bulls has been attributed by Nobis to *Bos primigenius* (1990:17).

Cretan sites other than Knossos provide probable evidence of wild cattle (Nobis 1989:222; 1990:17; 1993:109-113). At Tylissos wild and domestic cattle bones and horn cores dating from MM - LM II were identified (Hazzidakis 1921a:76-77, fig. 40). Nobis attributed two large horn cores and the connecting frontal bone recovered from a cistern at Mallia to *Bos primigenius* (Chapouthier *et al.* 1962:19, pl. XL; Nobis 1993:109-110). The remains of both wild and domestic cattle dated to the LM IIIA period were identified at Khania (Nobis 1993: 109-110).

Nobis' assertion that these bones represent wild, domestic and crossbred cattle is based on the comparison of bone and horn sizes with assemblages from other Cretan sites (1993), European and Near Eastern assemblages (Nobis 1989:218, tab. 2, 219). Nobis interprets the crossbreeding of cattle and goats as an intentional freshening of the gene pool and, in the case of cattle, to provide hybrids for bull games (1989:218; 1990:17; 1993:110). As hybrid cattle

are larger than domestic cattle it is also possible that they were bred for their motive potential as a stronger alternative to the smaller domesticate. Castration would ensure that they were manageable. Nobis (1993:115) concludes that if one accepts Jarman and Jarman's (1968) assertion that the Neolithic assemblage from Knossos represents domesticates throughout then the wild cattle, goats and pigs identified throughout Minoan Crete must represent an imported population. The alternative interpretation is that prior to the arrival of man wild animals, including cattle, inhabited Crete, having arrived via land bridges during the Pleistocene and that the absence of such evidence from the Neolithic Knossian assemblages should be put down to *Fundlücke* (Nobis 1993:115-117). A further possible explanation is offered by Bloedow who suggests that some of the cattle imported during the Neolithic Period became feral and were the ancestors of those hunted during the Bronze Age (1996:31-2). As is discussed above, in a short period of time, feral cattle can revert to a physiological type more akin to their wild ancestors. This may explain the bones exhibiting features more frequently associated with wild rather than domestic cattle.

The conclusions reached about the wild/domestic status of the Knossian assemblage by Nobis (1989; 1990; 1993) and Winder (1986; 1991) are strikingly similar. This is particularly interesting when the period, size and composition variations of the two assemblages and the differences in method of study are taken into account. These findings along with Gamble's (1980:288 (see above)) assertion that Jarman and Jarman found bones they described as approaching the expected size of *Bos primigenius* among the Neolithic assemblage necessitates serious consideration of the possibility that the Cretan assemblage represents wild, domestic and crossbred cattle throughout the Neolithic and Bronze Age.

The Containment of Animals

An important part of the management of domesticates is the control of their movement. This can involve keeping a group of animals in a particular area or controlling an individual through physical restraint. In terms of equipment the latter would involve ropes and nets, evidence of which is limited. There are however representations on seals and sealings of animals tethered (Dog: CMS VS IB 58, VII 66, XI 316; CS 239; Griffin: CMS I 128) and, in the case of cattle, caught in nets (CMS VIII 52, XI 128; AT 55, 60 [fig. 2.6], 61) while terracotta animal figurines are sometimes painted or modelled with nets and harnesses [fig. 2.7].⁶⁶



Fig. 2.6

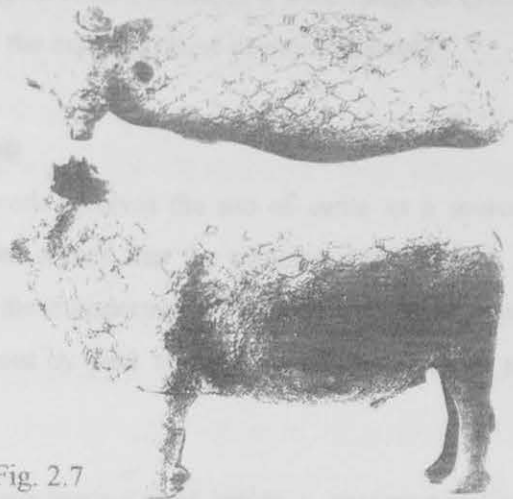


Fig. 2.7

Wooden fences have not been preserved but there are several examples of architectural elements within settlements that probably served as pens. The small 2-3 roomed house at Katsambas has an attached open yard, possibly used as an enclosure for animals (Alexiou:1954:371; Weinberg 1970:617; Sakellarakis 1973:135, fig. 259), while a walled rock shelter in front of the two roomed structure at Magasá may have served a similar purpose (Hutchinson 1962:51). Areas 12, 13 and 14 of the settlement at Myrtos (EM II) represent an unusual sequence of narrow passages, the entrances to which are too narrow for easy human access. It has been suggested that these represent an area where sheep and goats could be penned within the settlement (Warren 1972:29). At the LM IIIC refuge site of Katalimata Area B, a terrace with a single access route shows evidence of a simple shelter that may have served as a temporary refuge area for flocks (Haggis & Nowicki 1993:327). A clay brick from Neolithic Knossos (stratum IX/ EN IA) set with an ovicaprid hoof print serves as evidence that animals were at least sometimes kept in or near areas of manufacture or settlement (Evans 1964: 144, plate 31, 4).

In discussing the Miniature Fresco from the West House at Akrotiri Warren made a comparison between the *oval fold* to which animals are being led and the *mandhra* a type of sheep and goat fold still used in Crete today (1979:122; Haggis & Nowicki 1993:309). Morgan suggests that the close proximity of the enclosure to a fig tree may have been intentional; the tree providing both food and shelter (1988:18). Shelter is particularly important to cattle, which unlike sheep and goats, are very sensitive to bright light (see below).

The Role of Cattle in the Cretan Agricultural System

Other than the faunal remains, the archaeological record provides a wide range of evidence

Other than the faunal remains, the archaeological record provides a wide range of evidence relating to the development of agriculture and the exploitation of domestic animals.

Traction: Transportation and Ploughing

In modern-day India, 80% of agricultural work involves the use of cattle as a source of motive power (Lensch 1987:57). It has been argued that the evidence from Bronze Age Crete suggests a similar scenario. Much of the transportation of goods both in settlements and further afield would have been carried out by pack animals including oxen and asses (Evans 1928:156-7; Warren 1994:207).

...until the introduction of the motor-car and mechanized road building...transport in Greece was largely conducted on foot or animal back
(Crouwel 1981:147)

Pack animals would have proved ideal for the transportation of lightweight raw materials, produce and manufactured goods (Tzedakis *et al.* 1989:59). Some LM III B-C sites including Katalimata (Haggis & Nowicki 1993:18-19) and Vrokastro (Hayden 1983:369), chosen partly because of their inaccessibility, were approached by steep and narrow paths and the inhabitants would therefore have relied on pack animals. Indeed a large number of Bronze Age Cretan tracks would not have been suitable for wheeled vehicles and would have been used solely by pedestrians and animals (Crouwel 1981:29).

Evans attributed a clay figure of an ass carrying jars found at Phaistos to the LM period [fig. 2.8] (1928:156-7, fig. 79) while Crouwel dates it specifically to LM IIIC (1981:44).⁶⁷

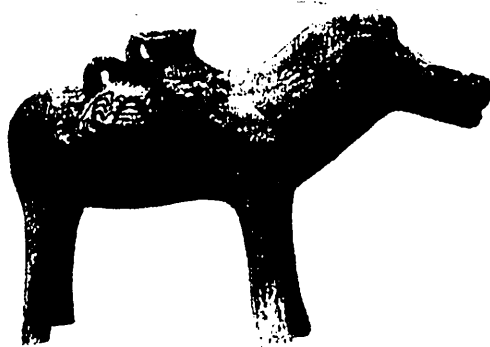


Fig. 2.8

Cattle and equids would also have been used to pull covered and uncovered carts. These vehicles were essential for the transportation of heavy and bulky agricultural products and construction materials such as wood and stone (Crouwel 1981:54; Sherratt 1981:261;

Dickinson 1994:49). Crouwel suggests that bovid rather than equid traction would have been more appropriate for pulling wagons as *...it provided the slow but steady, strong traction required* (1981:54; Palaima 1989:89). It is possible that the greater percentage of the cattle bones from Kastro may reflect, in the absence of a sizeable equid population, the role of cattle as pack animals (Klippel & Snyder 1991:181).

A small clay wagon decorated in the MM I style was recovered from Palaikastro. It was painted with what are described as the beam ends and upright bars and is a representation of a type of vehicle that would have been drawn by either cattle or asses [No. 170] (Evans 1928:156, fig. 78, HM 4743). Although it is usually assumed that oxen and bulls are most suited to the role of draught animals Jarman (1972:319) states that cows too could be used and have the added advantage of supplying milk.

Urban paths and roads and more extensive networks have been identified throughout Crete (Evans 1928:60-79; Warren 1972; 1994; Hayden 1983:373-4; Coulson, Day & Gesell 1986:385; Chryssoulaki 1990; Tzedakis *et al.* 1989; 1990; Macgillivray & Driessen 1990). In general, roads within urban settings are too narrow and steep to facilitate the movement of wheeled vehicles (Warren 1994:207). It is the design of roads that connect regions and communities that provide evidence that factors such as gradient, width and the suitability of the surface were taken into account. These considerations suggest that such roads were used by heavier wheeled traffic (Evans 1928:62-63; Tzedakis *et al.* 1989:44, 58; Warren 1994:207). The network of roads would have served a variety of functions including connecting urban centres with ports (Evans 1928:62-70; Vickery 1936:86; Warren 1994:208), other urban centres (Evans 1928:62-70; Tzedakis *et al.* 1989; Warren 1994:208), agricultural regions (Evans 1928:72; Warren 1994:208-9), sources of raw materials (Evans 1928:62; Tzedakis *et al.* 1989:57) and sites of religious and ceremonial importance (Tzedakis *et al.* 1989:44, 57; Warren 1994:208-9).

Although rough tracks would have existed during the Neolithic (Warren 1994:204), the earliest evidence of roads dates to the EM period and includes the EM II roads at Myrtos (Warren 1972) and roads linking Knossos with other regions dating from EM III (Warren 1994:201-5). These appear to link the settlements with agricultural land and other urban centres. The MM period sees an upgrading of the road network coinciding with the establishment of structures which have been identified as guard posts at key vantage points along the routes. These probably served a variety of functions including the control,

monitoring and defence of these vital communication and trade routes (Evans 1928:77-79; Tzedakis *et al.* 1989:60; 1990:74).

Although the evidence is limited, it is likely that cattle were used to pull ploughs in Crete (Palaima 1989:89). The only identified representations of ploughs comes from Linear A script where a pictograph bearing a striking resemblance to the sole-ard type of plough demonstrated in small terracotta models from Early Bronze Age Cyprus has been identified (Sherratt 1981:267). In terms of agricultural practices, the introduction of the plough enabled man to exploit poor quality land resulting in the establishment of settlements in marginal as well as prime agricultural regions (Sherratt 1981:262; Davis 1987:162).

Milking and Milk Processing

As the changes that occurred in the relationship between man and beast with the introduction of milking do not involve large technological advances, the process does not leave an archaeological record in the form of the development of new equipment or representations of equipment nor does it leave a mark on the archaeological landscape as do road networks or even plough furrows. Most of the evidence is therefore derived from representations of milking and milk processing and the identification of the development of new vessel shapes.

A fragmentary Late Bronze Age sealing from Knossos has been interpreted as representing a cow being milked from behind [No. 171] (Davis 1987:161).

As discussed above, such a position would enable the milker to simultaneously stimulate the perineal region and teats. In the Baden culture and South Russia tube-like tools used for blowing into the vaginas of cows have been identified (Sherratt 1981:277). Similar bone tubes are found in the Minoan assemblages. Some are perforated and probably served as whistles while it has been suggested that the unperforated examples may have served as mouth pieces for a type of ancient bag pipe (see below). It is also possible that they were used to stimulate the cow to lower her milk.

Zeuner, in discussing the Mosaic Frieze from the façade of the Temple of Nim Hursag at El Ubeid, Iraq [No. 169] suggests that the cows are being milked from behind as this is traditionally the way sheep and goats were milked (1963a:218-19, fig. 8:18; Amoroso & Jewell 1963:134). The only image of sheep being milked on Crete however is a sealing from MM III – LM I

Knossos showing the men straddling the animals [No. 172] (*CMS* VS 1A 137 (see below)). Evidence that the sealing from Knossos is a representation of a common way of milking on Crete during the Bronze Age is therefore limited.

A further problem with this image is that there is no indication of a vessel into which the cow is being milked. If this is an image of milking it is possible that the impression of the vessel is too light to be detected or that the figure holds a vessel or animal skin container between his legs as on the mosaic frieze from the Temple of Nim Hursag at El Ubeid, Iraq [No. 169] (Amoroso & Jewell 1963:133). The vessel may also be either very small, as in the case of the relief from Deir al-Bahari, 11th Dynasty (Houlihan 1996: fig. 9), or not represented.

It is also possible that the image, rather than representing milking, represents the castration of a bull. If this is the case, the size of the animal would suggest that this is an older bull and that the castration would have involved the severing of the spermatic cord, a method comparable to that attested in ancient Egypt (see above).

The difficulty in determining whether this image represents a cow being milked from behind or the castration of a bull is comparable to the problems surrounding the interpretation of a limestone relief from Ur where the figure similarly holds either the testicles or udders of the animal [fig. 2.9] (Amoroso & Jewell 1963:133. Pl. XVc).



Fig. 2.9

This image was originally described as representing castration but has more recently been interpreted as representing milking, the herdsman blowing into the vagina of the cow.

It has also been suggested that a figure is represented milking a cow in a MM I bowl containing small-scale models of cattle (Glantz 1952:191). As the figure does not appear to be touching the cow it is probably safer to assume that it represents a herdsman.

In the sealing from Knossos showing men milking sheep [No. 172] (CMS VS 1A 137) the figures are clearly milking into large open-shaped bowls, a practice still attested in modern day Crete. The shape of the bowl is similar to the Roman *Mulctrum*, an open-shaped pot with a prominent rim, intended to limit spillage (Hilgers 1969:227; White 1975: 171-172, fig. 47, plate 11).⁶⁸ The Minoan equivalent appears in addition to have a low foot. This shape of vessel is also depicted in Egyptian representations of milking including a 6th Dynasty relief from the tomb chapel of the Mastaba of Kagemni, Saqqara (Houlihan 1996: fig. 8) and a relief fragment likely to be from a 5th dynasty tomb, Saqqara [fig. 2.1] (Harpur 1985:39, fig. 8).

The Bronze Age Cretan climate was not conducive to the long-term storage of milk. In such circumstances, milk that is not to be drunk immediately is usually processed. On Crete this is emphasised by the fact that it is cheese rather than milk that is recorded in the Linear B tablets, the longevity of milk being insufficient for it, in an unprocessed state, to play a role in the island-wide distribution network (Palaima 1989:88). The Roman writer Columella (*De Re Rustica* 7.8.1) emphasised the economic importance of milk processing. For farmers based some distance from settlements, cheese production was essential in getting the milk to market. This is still the case in India where most milk processing is done on a local level (Lensch 1987:123). From the beginning of this century, Xanthoudides described vaulted chambers, strikingly similar to Bronze Age chamber tombs, being used for the processing of milk and the storage of cheese during the summer by the shepherds on the plain of Nída, Mount Ida (1924:Appendix).

The processes of cheese production and milk fermenting are simple and the resulting products, as well as proving long lasting are also safe. In particular, the processes break down lactose thus making it easier to digest than the raw food (Kosikowski 1966:1, 4-6, 8, 28-29).⁶⁹ Throughout the Mediterranean, levels of lactose intolerance are high. It is therefore not surprising that most of the milk produced today in Greece and Southern Italy is processed (Sherratt 1981:276-277).⁷⁰ The process of cheese production is discussed by Columella (*De Re Rustica* 7.8.1-2) who explains how a clean vessel with a hole in the bottom that can be

blocked and unblocked is required to separate the whey from the curds and then is sealed and stored until needed. The Greek poet Homer described this practice in his account of Odysseus' encounter with Polythemus (*Odyssey* IX). After milking the goats, the cyclops:

...curdled half the white milk and gathered it in wicker baskets and stored it away, and the other half he set in vessels that he might have it to take and drink, and that it might serve him for supper.

Homer (*Odyssey* IX)

Polythemus' use of wicker baskets to store the curds would also allow the whey to run off. Other primitive methods of cheese production rely on cloth bags to separate the curds from the whey (Kosikowski 1966:4-6).

The vessels represented outside the huts on the Uruk cylinder seal [fig. 2.4] are described by Sherratt as milk jugs (1981:fig 10.12), possibly indicative of milking or the processing of milk. In addition to the scene of milking on the Mosaic Frieze from the Temple of Nim Hursag, El Ubeid [No. 169] figures are represented processing milk. In the wall decoration from the Mastaba of Ptah-hotep II and Akhet-hotep, Saqqara [fig. 2.3] a man represented behind the cow that is being milked appears to be sealing an amphora-shaped vessel. Davies described the green material used as a stop as a bundle of grass, having witnessed this method of sealing vessels in modern day Egypt (1901:16). Similarly in the late 6th Dynasty tomb of Kheni at El-Hawawish, three vessels with comparable stoppers are represented to the side of a cow being milked [fig. 2.10] (Kanawati 1991:fig. 1). It is probable that such images represent the temporary storage of milk, the stoppers ensuring its safety during transportation to a place of either consumption or production.

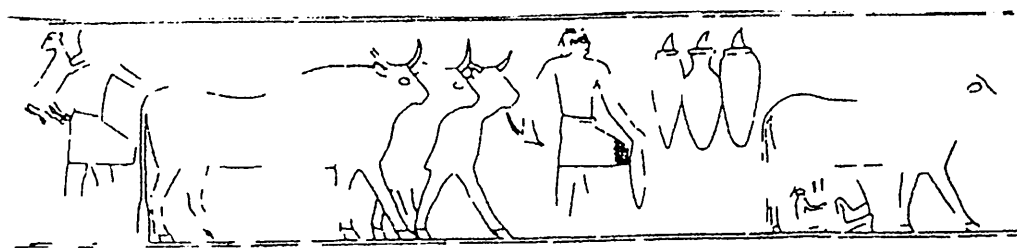


Fig. 2.10

The exploitation and processing of milk has been identified as a contributing factor to the changes in pottery shapes and types during the Bronze Age (Sherratt 1981:281-2). Open shapes had dominated during the Neolithic but during the Bronze Age there was an increase in the range of drinking and pouring vessels as well as in the development of buckets, jugs

and funnels used in the transportation, storage and processing of milk. Renfrew however attributes these changes to the production, storage and consumption of wine (1971:282). During the Bronze Age we do indeed see an increase in the variety and quantity of liquids commodities exploited⁷¹ and on reviewing the archaeological data for Bronze Age Crete, Hamilakis concludes:

Systematic wine production seems to have started in the first-palace period, reaching a peak in the second-palace period. Systematic production of oil seems to have started in the second-palace period and intensified during the 'post-palatial' period.
(Hamilakis:1996:24)

Sherratt however argues that the changes are too wide-reaching and extensive to be attributed solely to wine (1981:280) and others have suggested that some types of vessels were used specifically in the processing of milk. For example, Fouqué suggested that pierced bowls may have served as cheese moulds, the holes allowing more rapid evaporation of water (1897:122).⁷²

There are no images from Bronze Age Crete that can, with any certainty be identified as representations of the transportation and processing of milk. There are however numerous images on MMI-III three-sided prism seals that possibly represent the transportation and processing of commodities. A frequently occurring image is that of a pole from which two to five vessels are suspended (CMS II2 107, 124, 125, 151 [fig. 2.11], 225, 290, 297; IV 10, 125; VIII 13; IX 13; XII 43, 47, 48, 64; XIII 272). In some cases these are either carried or represented in the same field as human figures (CMS III 300; II2 214, 224 [fig. 2.12], 302, 306; IV 11; XI 7, 122, 298; XII 29).

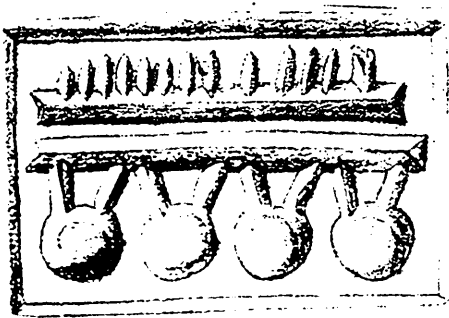


Fig. 2.11

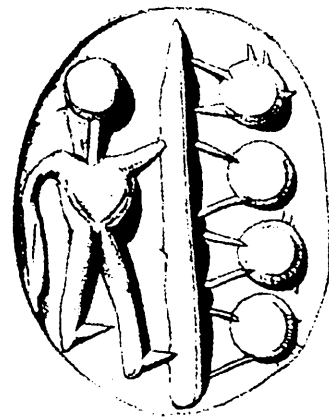


Fig. 2.12

Such containers would be ideal for the transportation of liquids and Evans suggested that they may have been used for the transportation of milk (1984:337-338, fig. 55). This type of

vessel and means of conveyance would however be equally appropriate for the transportation of other commodities. The representation of additional elements in the field may be related to the function of the vessels. For example, the inclusion of large fish in two images (*CMS* XII 43, 48) might indicate that the pole and vessels were used for fishing. Nets or baskets attached to poles were used to catch fish during the Bronze Age (Williams 1996:51-2). It is also possible that the fish might indicate the transportation or storage of fish.

A wide range of different types of vessels and jugs are represented on MM I-III three-sided prism seals. Some have suggested that the images of human figures with pots represent potters at work (*CMS* II2 178, 179, 190; VIII 15; XII 94). If these are images of people potting we would expect the representation of wheels and the sitting figures to be touching the bodies of the pots as is the case in comparable Archaic and Classical Greek images (Figs 2.13) (Noble 1966; Richter 1923:figs. 58-60, 63). In Bronze Age examples described as representing potting, wheels are not however represented and rather than touching the bodies of the vessels, the figures appear to be holding them by the handles (*CMS* II2 178 (Fig. 2.14), 179, 190; XII 28).



Fig. 2.13

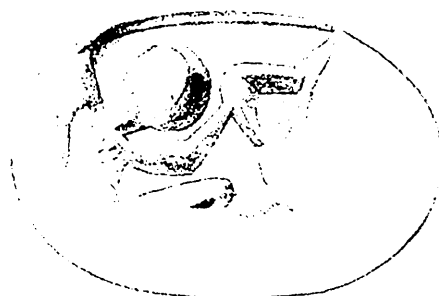


Fig. 2.14

Although this may represent the attaching of handles, as is represented on a 6th century Black Figure Kylix (Fig. 2.15) (Richter 1923:fig. 61) it appears more likely that the figures are holding the vessels by their handles.

In two further examples the figures are standing (*CMS* II1 391; II2 157) while in *CMS* XII 94

the figure holds two vessels. In later Greek iconography all the stages of pottery production from the mining of clay to the decoration and firing of pots are represented (Richter 1923:64-79) and it is possible that these images either represent other stages in the process of pottery production (eg. the transfer of vessels from the wheel to a drying area or the kiln) or are indicative, rather than representative, of the production of vessels. We cannot however rule out the possibility that they represent the consumption, transportation or processing of commodities.



Fig. 2.15



Fig. 2.16

A further group of images show figures holding jugs above large storage pithoi (CMS II2 237; IV 10; VS 1A 43 (fig. 2.16); XI 122; XIII 80). Although such images may depict pottery production, the representation of the action of pouring or scooping is more likely to be indicative of the processing, storage or consumption of commodities. Large pots were probably used for the storage of liquids, grains, dried fruits and dried and brined meats. They would however have proved unsuitable for the storage of raw or processed milk and these images are therefore unlikely to represent specifically the processing or storage of milk.

The importance of these images to the current study lies in the fact that many, if not all, reflect the importance of the processing, storage and consumption of commodities in Middle Minoan society.

The Utilisation of Cattle Faeces

In North-Western Europe we see the dairy cow primarily as a source of milk. In India the products of the cow: milk, curd, butter, urine and dung are grouped together under one term, *pancagavya*. This emphasises not only the equal weight given to milk and dairy products but also the importance of dung and urine, commodities which are not given a high priority in Western Europe (Eichinger Ferro-Luzzi 1987:106). The Indian system exploits energy more efficiently than modern large-scale dairy or beef cattle breeding (Lensch 1987:61) and is probably more akin to the Bronze Age Cretan system.

Certain evidence of the use of cattle faeces and urine is however absent from Bronze Age Crete. LM I terracing on the island of Pseira, just off the coast of Crete, containing village debris down to the bedrock has however been interpreted as representing the tillage of household waste and animal manure (Betancourt & Simpson 1992:53; Betancourt 1995:164). In India dung serves as fuel and mixed with water it is used to surface floors (Lensch 1987:58-9). There is no evidence of such activity from Crete although in remote areas with little access to wood for fuel, it would be reasonable to assume that dung was utilised.

Specific Contextual Evidence; Consumption and Ritualistic Practices

During the Neolithic, evidence of consumption is largely restricted to Knossos. From stratum X (AcN) animal bones were found in a pit which also contained ash, charcoal, and carbonized grain (J. Evans 1964b:140) while in a stratum VIII (EN Ia) house a smashed pot with animal bones was described as a *lost meal* (J. Evans 1964b:164). Bökönyi, talking in general terms about Greek Neolithic sites, describes bones in settlement refuse contexts as *kitchen remnants* (1973:175). This certainly appears to be the case at Neolithic Knossos where bones found both inside and outside buildings were discovered with ashes and broken pottery. From stratum VII (EN I) onwards *pebble paving* (J. Evans 1968:268) between the buildings is in some cases covered with animal bones.⁷³ J. Evans suggested that these were outdoor working areas (1968:268). Indeed, it is from outdoor deposits that the majority of bones have been recovered (J. Evans 1968:268).

Beyond the contextual details provided by J. Evans factors such as butchers' marks and evidence of bones being broken for the removal of marrow have not been recorded and discussed except for the occasional comment relating to the state of preservation (Jarman & Jarman 1968:241). This is in part due to the manner in which the database is stored. It consists of a series of punch cards; no non-numerical characters are used. Although an ideal method for recording facts such as measurements and ages, it greatly limits the scope for description (Winder 1986:77-78). Unfortunately, the bones from the 1957-60 excavations have been disposed of and the later material has been stored in polythene bags which in many cases, have split ...*separating bones from labels*, thus making the possibility of a new study unlikely (Winder 1986:235).

Contextual evidence from Neolithic Phaistos is limited, although it was recorded that fragments of bones were found in a hearth (Pernier 1935:117) and Mosso described how the articular extremities of the bones of large birds were blackened as if *roasted on a spit* (1910:68).⁷⁴

Bronze Age evidence of consumption practices is equally scant. From the EM II settlement at Myrtos, rooms 38, 39 and 40 have been described as living and eating rooms because of the concentration of animal bones and limpet shells and a number of obsidian blades possibly employed in the preparation and consumption of food (Warren 1972:16). Similarly an area (57) containing 22 burnt bones, a blade and flake of obsidian, pottery, a jug, numerous cooking pots and a baking plate has been interpreted as representing a two-storey structure with an upper floor used for dining above a ground floor kitchen (Warren 1972:51-2). Rubbish tips containing broken objects, shells and animal bones have been identified throughout the settlement (Warren 1972:23; Whitelaw 1983: 327) while evidence of outdoor cooking activity from the East-West way (67) consists of a tripod cooking pot, a bowl and animal bones (Warren 1972:61).

Butchers' marks have been identified on one long bone from the Unexplored Mansion (Reese *et al.* 1995:189). Many of the fragmentary bones from Tylissos (MM - LM II) appeared to have been cut and were found among food debris (Hazzidakis 1921a: 76-77, fig. 40). From Kommos, concentrations of burnt bones are identified throughout the settlement (Reese *et al.* 1995:170. Tab. 5.5).

From LM III B-C Vronda and Kastro cut marks have been identified on the bones of agrimi, badger, hare, cattle, dog, deer, goat, pig, and sheep (Klippel & Snyder 1991:181), suggesting that both wild and domestic animals served as a source of meat. There is further evidence that a large proportion of medium and large fresh bones were broken either by humans or carnivores, especially at Kastro (Klippel & Snyder 1991:181-3). If this was human activity it is evidence of bone marrow and grease extraction. Study of the caprine bones from the LM III B-C site of Kastro shows that high proportions of animals were killed between the ages of one to three (Klippel & Snyder 1991:184-5, fig. 1). An older caprine population would suggest that wool was the primary concern while a higher percentage of mortality during the first year would suggest that milk was important. Klippel and Snyder state that although the mortality profile suggests that the animals were exploited primarily for meat, this does not negate the probability that caprines were also exploited for milk and wool (1991:184-5). From the Iron Age site of Halasmenos there is evidence of butchers' marks and burning on the bones of sheep, goats, pigs and cattle, suggesting consumption (Snyder & Klippel 1994:92).

When the function of the context is unclear it can be difficult to determine precisely what the

presence of animal bones indicates. Rutkowski and Nowicki (1996) identified twenty-one caves as being inhabited during the Neolithic and/or sub-Neolithic, a conclusion based on the presence of pottery, tools and animal bones in chambers towards the front of the grottoes. Many of the caves occupied during the LN period show continued usage throughout the Minoan Period. In some cases however the evidence seems to suggest a change in function. At several sites there is evidence that the deeper chambers of the caves were later regarded as sacred (Rutkowski & Nowicki 1996:18, 24-25, 42, 45-69). The almost complete absence of models/offerings in these areas during the Neolithic (Rutkowski & Nowicki 1996:33), and a concentration of objects associated with settlement, would suggest that the ritualistic aspects of these sites was a Bronze Age development. During the EM Period there is also increased evidence of caves being used as burial grounds (Rutkowski & Nowicki 1996:11-24). In this type of situation where it is both difficult to determine what an environment was used for, and in some cases possible to identify evidence of several different types of activities, it is hard to attribute the presence of animal bones to one particular practice. Charred animal bones may represent consumption of a normal meal but may equally represent a meal associated with ritual (funerary or ceremonial), a sacrifice or indeed a combination of all or some of the above.

Even when animal bones are found in association with buildings that served particular purposes, for example tombs or shrines, the processes resulting in them being deposited in these contexts are rarely easy to ascertain. Animal bones found in ceremonial contexts may indicate sacrifice (Dickinson 1994:266) but may also indicate a cultic meal, an offering or indeed a ritual composed of a number of elements. Bergquist records the discovery of Minoan strata at Kato Syme containing ...*black fatty earth, animal bones, ashes and intact or broken cultic vases and votives* (1988:25; Lebessi & Muhly 1990:324, 327) but is wisely reluctant to conclude that these represent either sacrifices or evidence of cultic meals. Marinatos (1986:11) states that when animal bones in ritualistic contexts are interpreted as being from meals, we can assume that this was preceded by a sacrifice. Use of the term 'sacrifice' however implies specifically an offering to a deity whereas ritualistic slaughter and meat preparation need not include a dedication to a god.

Below the Domestic Quarter at Mallia (room III-IV) is a room (B) that has been interpreted as being used for sacrifice, in part due to the presence of bulls' horns in an adjoining room (g). Marinatos questions whether the evidence is indicative of a venue for sacrifice or another stage of a ritual involving outdoor sacrifice (1986:19). At the MM III House of the Sacrificed Oxen, Knossos, two bucrania were found in what has been described as a

ritualistic context which again raises the question of whether or not the bucrania represent sacrificed animals, and if so, were they sacrificed in this room, in another part of the building or at another location (Evans 1928b:283, 304, 324; Marinatos 1986:19).⁷⁵ It has also been suggested that the horns were hunting trophies, rather than sacrificial commemorations (Bloedow 1996:31-2).

Sakellarakis and Sakellarakis suggest that the contents fallen from the room Hall 10 of the Palace building, Tourkoyeitionia indicate that this was used as a shrine at the time of destruction (LM II) (1997:98-100). These objects include a monolithic table, possibly used for cattle sacrifice, a tripod offering table, two horns of consecration, a double axe base, vessels, a seal carved with an image of bovine figurines and other animals and animal bones *...probably the remains of sacrifices* (Sakellarakis & Sakellarakis 1997:98-100). A similar function is determined for a first-floor room above Area 17 from which similar ritualistic objects, including animal figurines, an animal skull with terracotta tray and a stone basin containing animal bones had fallen (Sakellarakis & Sakellarakis 1997:108). The claim that this is a sanctuary area is further supported by comparable evidence, including animal skulls found together with terracotta trays, from the earlier levels (MM III - LM IA) (Sakellarakis & Sakellarakis 1997:109 -110). The excavations of a MM IIB temple at Anemospilia has been interpreted as providing evidence of both sacrifices and offerings to deities (Sakellarakis & Sakellarakis 1997:269-274). Cattle, pig and goat bones were found in the west part of the antechamber (Sakellarakis & Sakellarakis 1997:275-277). It is further noted that *the bones were consistently found adjacent to or on top of broken pieces of two enormous clay disks* (Sakellarakis and Sakellarakis 1997:277). The disks are about a meter in diameter and too thin to have supported bones without a supporting stand.

The occurrence of bones in unusual or unexpected contexts and the absence of bones from ritualistic contexts is often taken to indicate specific ritualistic practices, deviations from the perceived ritualistic norm. Examples of this are the cattle horns found in the granaries at Mallia (Marinatos 1993:101) and the absence of bones from the peak sanctuary at Atsipadhes (Dickinson 1994:269).

Animal bones from funerary contexts tend to be even less thoroughly documented than those from other types of sites. In a funerary context, the presence of bones may be associated with ritualistic consumption or offerings made to the dead (Sakellarakis & Sakellarakis 1997:203, 222, 255-6) rather than purely sacrifices to a deity.

The complex evidence of Tomb B, Phourni emphasises the importance of not oversimplifying and generalising about funerary ritual. Dog bones were identified in the dromos of Tomb B, Phourni (LM IIIA) (Sakellarakis & Sakellarakis 1997:171). Some of the skeletons were almost intact, while in some cases the heads had been detached.⁷⁶ In the area beneath the inner barrier of the dromos, the bones of pigs, dogs and hares and seven boar's tusks were further discovered. In a small trench (LM IIIA) in front of the earlier entrance to the tholos of Tomb B, animal bones and a boar's tusk were found with human bones and teeth and ritualistic objects (Sakellarakis & Sakellarakis 1997:173).

In an EM I tholos tomb at Krasi the bones of hares, dogs, oxen, sheep and pigs were identified (Marinatos 1986:11) and at Tomb A (LM IIIA1 burial), Phourni (Sakellarakis 1967; Sakellarakis & Sakellarakis 1997:164-165) the remains of both horse and cattle have been attested. Kosmetatou describes this as the only Cretan evidence of ...*funerary horse sacrifice* (1992:32). The only conclusion that can be drawn is that funerary ritual encompasses a broad range of activities and could involve different animals, even within the context of a single tomb or burial.

Recycling and Secondary Usage: Bones

Beyond its primary function a commodity may serve a wide range of purposes. The processes of change that facilitate transference between different systemic contexts have been defined by Schiffer (1976:37-39) as:

- 1) *Recycling*: the creation of a useful object from a by-product of another process or from an object that is useless in its present form.
- 2) *Secondary use*: the use of an object for a purpose other than its primary use without modification.
- 3) *Lateral cycling*: the transference of an object from one user to another without modification or a change in use.

Unlike the third category, the first and second need not necessarily require a change in user. These categories constitute a clear framework in which to discuss the use of bone, horn and teeth and will be applied throughout.

Bone, both readily available and versatile, was, along with stone, the most frequently used material in the production of tools throughout the Neolithic and Bronze Age (Evely 1993:106, 107). Bone was also employed in the production of a wide range of other utilitarian and decorative objects.

Horn was also used in the production of tools and objects but as it is particularly prone to decay no actual horn has been recovered from either Neolithic or Bronze Age contexts. Concentrations of horn cores in workshop contexts and evidence of their treatment serves however as an indication of the use of horn. Sakellarakis and Sakellarakis further refer to the recent discovery at Poros of bucrania where the horns have been sawn off, probably evidence of the first stage of processing (1997:688). Jarman and Jarman, commenting on the scarcity of horn cores in the Neolithic Knossian assemblage (only one example of cattle and none of sheep were discovered) suggested that they may have been ...*removed for the purpose of tool manufacture* (1968:242).

Evidence of bone, ivory and horn working in a workshop context prior to MM IIIA is limited to a house in Quartier Mu, Mallia (MM II/III) which has been identified as that of a seal maker. Most of the evidence relates to the production of stone seals although there are a few ivory examples, some pieces of cut bone and worked deer antler (Detournay *et al.* 1980: 115 fig. 163; Evely 1993:243). From the Second Palatial Period there is evidence of bone working from both Zakro and the House of the Ivories, Knossos (Evely 1993:244). Horn cores with cut marks were identified in the LM II assemblage at Kommos (Reese *et al.* 1995:185-190) while horn cores with tips cut off (Hazzidakis 1921a: 76-77, fig. 40) were discovered at Tylissos.⁷⁷

As bone is weaker than stone and tends to splinter under pressure it is not suitable for working hard stone or thick leather. Instead, bone tools would have been used to work wood, bone/ ivory, softer stone and animal skins (Evely 1993:86) as well as serving as scoops, scrapers, burnishers and modelling tools (Evely 1993:106). The bone tools of Crete fall into two categories; those with points and those with flatter blades (Evans 1921:42; Evely 1993:106). Those with points constitute the largest category of bone tools.⁷⁸ Bores/awls, needles and points are described as being made from the bones of small animals, especially sheep and goats (Dawkins 1904-5:265; Mosso 1910:67; Pernier 1935:88; J. Evans 1964:236), while cattle bones would have been more suitable for the production of larger tools including spatulae (Taramelli 1887:297).

Needles and points were used in the production and sewing of textiles and skins (Mosso 1910:68;

Evans 1921:42; Pernier 1935:88; J. Evans 1968:271; Voigt 1983:214-215; Evely 1993:86) while awls would have been used to make holes in leather big enough for needles to pass through (Evans 1921:42; Pernier 1935:207,215; Voigt 1983:214-215; Evely 1993:86). Needles and points were probably also employed in the production of basketry, mats, textiles and nets (Voigt 1983:215-216; Blitzer 1995:497). Bone points could have been used for keying surfaces, scratching on guidelines and creating shallow hollows to be worked by stronger tools (Evely 1993:86). Points were also probably used to create ...*incised and punctuated decoration* on pottery (Evans 1921:42).⁷⁹ Stylets of varying shapes identified at Mallia may have been used as bobbins or shuttles (Effenterre & Effenterre 1976:69).

Flatter bladed tools included spatulae and shuttles (Effenterre & Effenterre 1976:69; J. Evans 1994:5, pl. 5c). Long-handled spatulae found in association with carbonised grain and quern stones at Neolithic Knossos may have been used to scrape the ground flour from the stones (J. Evans 1964a:40 note 8; 1994:5). Bone chisels would have been used for low impact tasks such as flaying animals and removing meat from bones (Taramelli 1887:297; J. Evans 1994:5) while a range of different blades could have been employed to smooth the surface of pottery (Taramelli 1887:297; Mosso 1910:68; Evans 1921:42). An unusual rectangular slab of bone that may have served as a tool was identified from the New Palace Period, Phaistos (Pernier & Banti 1951:245). A large *triangular implement* probably made from the perone of an ox may have served as a weapon (Mosso 1910:68).⁸⁰

During the Bronze Age there is evidence that both bone and ivory were used for the production of handles and pommels; bone would have been used for plainer examples and ivory for the finer pieces (Evely 1993:242; Effenterre & Effenterre 1976:70). Both bone and imported ivory were used for the production of seals, amulets, statuettes and marquetry.

Bone is ideal for the production of smaller objects such as seals as the volume of suitable material per bone is less than that afforded by ivory (Hood 1978:117; Evely 1993:224). Evely (1993:225) estimates that 40% of the published seals from the EM I - MM II are made of bone and that the shape and size can be taken as an indication of the animal from which the bone came. For example, she suggests that ring seals and hammer-head pieces were made from cattle metapodials (Evely 1993:225) while Krzyszkowski suggests that the straight shafts and thick walls of cattle metatarsals and metacarpals make them most suitable for seal manufacture (see CMS II 179, 210; V 21). A single astragalus cut through the middle from stratum III at Knossos may have been used as a rubber or burnisher (J. Evans 1964b:236). Tools found at

Myrtos (EM II), described as worn and smoothed, may have also served as burnishers and rubbers (Warren 1972:218,228). Small bone tubes, some pierced, have been described as whistles (J. Evans 1964b:236) and cannula or bagpipe mouthpieces (Mosso 1910:68; Pernier 1935:88) (see above).⁸¹ Other small bone objects have been described as a bobbin (J. Evans 1964a:54), beads (J. Evans 1964b:146, 182, 188, 236-7; Evely 1993:239) disks (Detournay *et al.* 1980:142) and bracelets (Evans 1930:408). Evans identified bone arrow plumes from ceremonial contexts at Knossos (1921:496, 548-9; 1935:175) and described small, flat diamond-shaped pieces of bone, ribbed on one side and carved with simple signs on the other, as gaming pieces (1921:405-409). From the pre-palatial period onwards we see the production of statuettes of human and animal figurines in both bone and ivory. Bone examples have been recovered from Mallia (MM I – II) and Palaikastro (LM I) (Hood 1978:117; Evely 1993:225-230) and an unusual bone carving of a capital or cleat was found at Knossos (Evans 1930:64). From EM II onwards there is evidence of the production of ivory and bone combs (Evely 1993:231) while the earliest evidence of bone inlays and marquetry dates to the First Palace Period (Evans 1921:496; Evely 1993:233-239, 248).

Although it is more difficult to detect secondary usage of unmodified bones than recycled or adapted bone tools, it has been suggested that the scapulae of bulls served as large spatulas (Mosso 1910:67; Pernier 1935:88).⁸² Tumasonis discusses the long Cretan tradition of using bones, including the shoulder blade of sheep, in divination and suggests that such practices may have their origins in Minoan times (1983:304-5). Unfortunately, however, any marks left on the bones as a result of such practices would be indistinguishable from butchers' marks. The large quantity of animal teeth found at Neolithic Knossos could have been used as cutting, scraping or boring tools (J. Evans 1964a:54; 1968:271). The use of animal teeth is also suggested by the discovery of pig teeth in Neolithic and more frequently Minoan levels at Phaistos (Pernier 1935:87).⁸³ The secondary usage of astragaloï is indicated by the unusual contexts in which they are found. At Knossos sixteen cattle astragaloï were found in a group consisting of eight pairs (stratum V) (J. Evans 1964b:236). Sheep and cattle astragaloï were also discovered at Phaistos (Mosso 1910:67). Pernier (1935:88) suggests that they were used to draw lots.

The horns of cattle may also have been subject to secondary usage. In Egypt they were used as non-porous containers for the transportation of commodities including animal fat (Ikram 1995:175).

Although it is impossible to estimate the numbers of cattle bones used as unmodified, recycled or adapted bone tools, there appears to be evidence that they were used for a wide variety of purposes. Before the introduction of equids, cattle were the largest animals on Crete and would therefore have been the sole source of bones for larger unmodified, recycled and adapted bone tools and objects.

Leather, Glue and Fat

As leather has not survived the evidence for Bronze Age usage is limited. In addition to Linear B references to animal skins and the production of leather goods (see below), impressions of secured objects left in sealings suggest that that animal skin was manufactured into leather pouches, strips and thongs (Weingarten 1983:40-41). As vellum or parchment it may also have been written on (Weingarten 1983:38, 41; Aravantinos 1984:42-43; Betts 1997:64).⁸⁴ Evans suggested that the vessels suspended from a pole represented on a MM I-III three-sided prism seal from Praisos were ...*skin buckets, no doubt intended to contain milk* (1894: 337-338, fig. 55).

Cattle skin is particularly large in surface and tough and was widely used in the manufacture of shields (Zeuner 1963a:241; Doumas 1985:32), as attested in the wall painting of figure of eight shields from Knossos (fig. 2.17) and the Mainland site of Tiryns.⁸⁵ On the miniature wall paintings from Thera, figures were represented carrying shields (Morgan 1988:108). The figures on the Ayia Triada sarcophagus are also described as wearing *hide skirts*, possibly specifically cow hide (Long 1974:36, 46). Ikteion or ship cabins (fig. 2.18) made of animal skin are also represent both in situ and as a frieze in the wall paintings of Akrotiri (Morgan 1988:figs. 67 & 97).

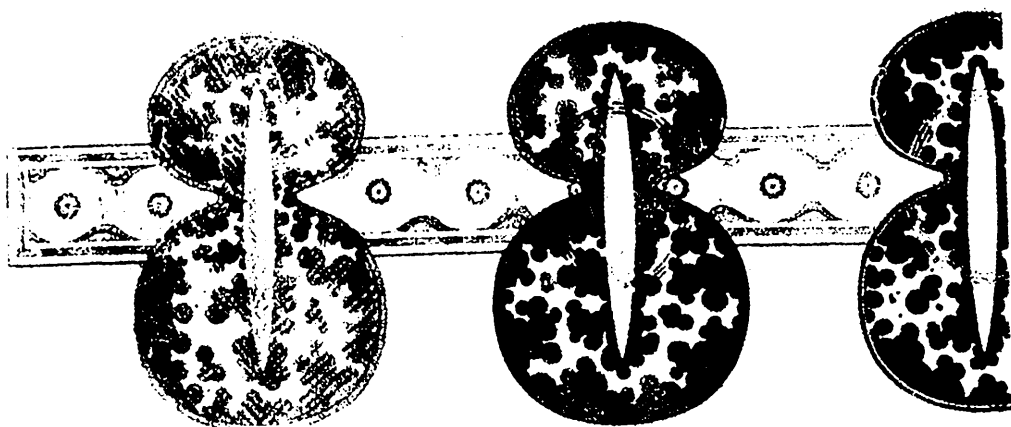


Fig. 2.17

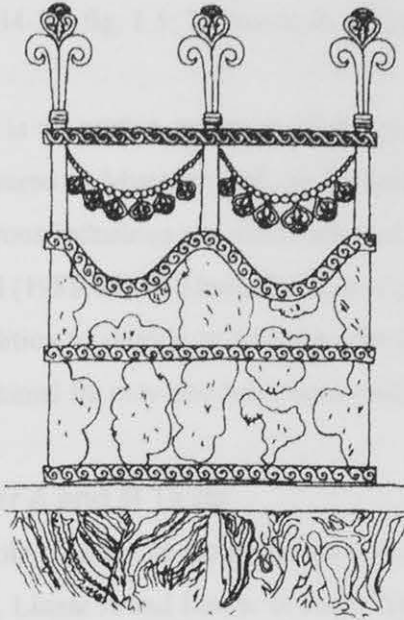


Fig.2.18

The size and necessary durability of these cabins would again suggest that they were manufactured from cattle hides. The shields and cabins all bear distinctive piebald markings comparable to those of the bulls represented in the taureador panels, Knossos (fig. 2.19).

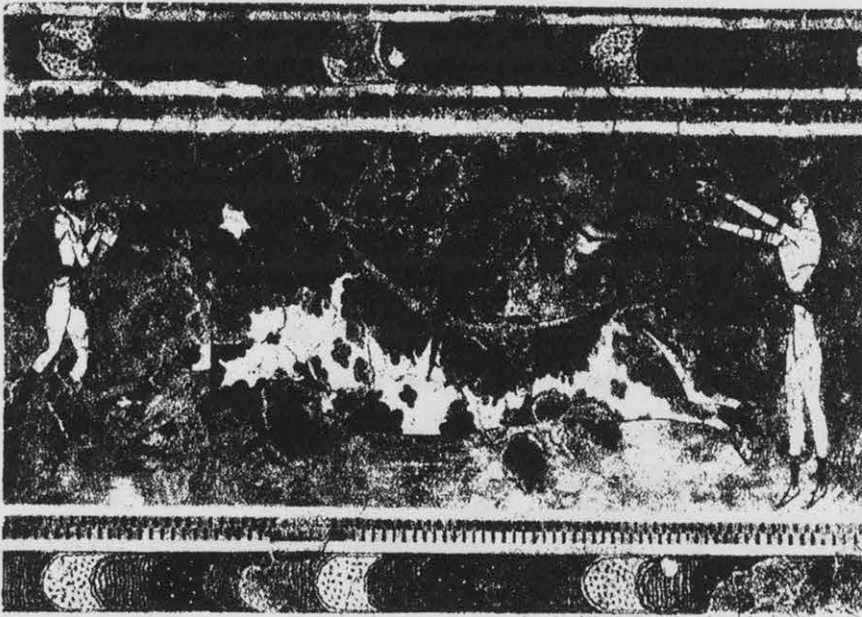


Fig. 2.19

Doumas suggests that particular markings may have had significance (1985:31-33). Linear B texts from Knossos record cattle as being black, white, wine-red and mixed colours (Palaima 1989:89) thus emphasising that the colour of pelage was considered an important distinguishing factor. Although the nature of glyptic does not allow for the indication of colour, there are several seals and sealings where the texture of the bovine pelage is indicated (CMS II7 182; IV 278). It is however difficult in the majority of cases to determine whether lines or marks represent folds of skin, markings, wounds or decoration [eg. No. 38] (Clottes

There is no certain evidence of the production of glue although a glue-like substance was discovered at Mycenae and, as Palaima stresses, an adhesive would have been essential to numerous industries and crafts attested in both the archaeological and specifically, Linear B record (1989:89).⁸⁶ Similarly there is no specific evidence for the use of animal fat although in addition to serving as an easily storable source of energy rich food, it has been suggested that animal fat may also have been used in lamps (Hamilakis 1996:21).

Linear A and B Texts

The role of cattle in the agricultural economy of Crete is further attested in the hieroglyphic script, Linear A and Linear B texts. These documents have come down to us in the form of baked clay tablets, nodules and sealings. It has been suggested that papyrus, vellum and wood may also have been written on but these materials have not survived (Weingarten 1983:38, 41; Aravantinos 1984:42-43; Betts 1997:64). Most of the evidence comes from administrative centres (palaces and villas) and consist of lists of people, animals, commodities and places. In these contexts writing serves as a bureaucratic tool, used to record quantities, storage and distribution (Chadwick 1987:11,33 ; Palaima 1990:83-84, 87; Betts 1997:64).

The earliest Cretan evidence of writing is in the form of a hieroglyphic script consisting of symbols depicting parts of or whole humans, animals and objects (Sakellarakis & Sakellarakis 1997:326). Ninety-six symbols have been identified on seals and tablets from thirty-two sites on Crete (Sakellarakis & Sakellarakis 1997:326-7). The script was used mainly during the Old Palace Period but the occasional inscription is found during the New Palace Period (Sakellarakis & Sakellarakis 1997:326). Unfortunately the script remains undeciphered.

318 Linear A tablets have been discovered at thirteen sites on Crete, dating from contexts as early as MM I-II (Schoep 1996:76; Sakellarakis & Sakellarakis 1997:330). The majority, 147 tablets plus fragments, were recovered from LM IB Ayia Triada (Chadwick 1987:45; Palaima 1990:84; Palmer 1994:133-134). Examples dating mainly from LM I were also found on the islands of Kea, Melos, Kythera, Samothrace and Thera (Schoep 1996:75). In addition to the tablets and roundels many inscriptions are found scratched into clay sealings, on vessels, offering tables, sarcophagi and metal objects (Sakellarakis & Sakellarakis 1997:330-333).

The deciphered signs include figs, barley, wheat, wine, olives, oil, sheep, goats, cattle and pigs (Palmer 1994:135; Sakellarakis & Sakellarakis 1997:334) emphasising the range of commodities and animals important to the Cretan agricultural system by the LM period. Commodities appear listed both individually and in groups (Palaima 1990:91-2). From Ayia Triada individual lists include cattle, figs, wine, olive oil and grain while from Khania cattle are listed with grain and goats (Palmer 1994:151-153). Cattle are also referred to on roundels from Gournia (GO Wc 1) and possibly Khania (Wc 2069) (Palaima 1992:466). The tablets from Ayia Triada each record two to three male cattle as elements of mixed commodity lists, the tablet and roundel from Khania each record single oxen, one specified as male. The roundel from Gournia records five oxen (Palaima 1992:467).

Palaima emphasises the importance of the distribution of these inscriptions in determining specific regions where the rearing of cattle was an important aspect of the agricultural system (1992:466-7). The tablets indicate the extent of centralised control and administration within a region (Sakellarakis & Sakellarakis 1997:334-5) and the need for a form of record keeping common throughout the island and even beyond. Schoep argues that Linear A was used as a tool in both island-wide administration and on a private level (1996:82). In comparison to the proportion of references to livestock we find in Linear B. However, Linear A records of animals are rare. Palaima suggests that this might reflect a lack of centralised palatial control over herding and shepherding activity during this period and further suggests that the administration of this area of agriculture was probably carried out at a local or regional level (1990:95).

Over 4800 Linear B inscriptions have been discovered at mainland Greek and Cretan sites dating from the period LM IB to the end of the thirteenth century (Palaima 1989:90; 1990:83-4). Linear B tablets are now largely deciphered although the interpretation of specific texts and words remains controversial. Tablets have been found at the Cretan sites of Knossos and Khania and the mainland sites of Pylos, Mycenae, Tiryns and Thebes. The texts have been linked with texts from Cyprus and the Near East (Ras Shamra) and words and names of probable Semitic and Asia Minor origin appear in Aegean Linear B texts (Lambrou-Phillipson 1990:109-116).

Agriculture features prominently in the tablets from Knossos. A third of the total are concerned with sheep and wool (Chadwick 1987:37). The D series of tablets alone record 80,000 - 100,000 sheep in the central region of the island (Killen 1984:49). These tablets

further record targets for lamb and wool production and details concerning the processing and manufacture of textiles (Killen 1984:49; Chadwick 1987:37). The large number of sheep bones and evidence of a dyeing industry at LM IIIB Mallia (Driessen & Farnoux 1994:64) suggest that this type of activity had by this period become centralised.

Goats, pigs and oxen are also listed. The Co series from Knossos refers to large numbers of goats, sheep and pigs and relatively small numbers of cattle. On the two tablets where numbers are preserved, the ratios of bulls to cows are 2:4 and 2:10 (Palaima 1992:469). Co 906 records only six cows (Palaima 1992:469). The four C (1) tablets list only oxen. C(1)5544 which records 91 animals, possibly served as a totalling text of the others.

Palaima suggests that this represents only a small percentage of the cattle under Knossian control (1992:469-70, 472). In these texts the cattle are associated with multiple toponyms, possibly indicative of their distribution from a central location (Palaima 1992:470).

The oxen seem to be linked primarily with traction and in one example from Knossos (Ch 897) both the driver and team of oxen are named. Palaima suggests that oxen were probably the main source of motive power during this period (1989:89). Prominent among the vehicles listed in the tablets from Knossos are several hundred chariots, some described as ornately decorated (Crouwel 1981:31, 150; Chadwick 1987:37). Although it is likely that equids were usually used to pull chariots, they may, on occasion, have been pulled by other animals, including cattle. On the Ayia Triada sarcophagus goats are represented pulling a chariot while piebald cattle are represented pulling the chariot of a Nubian prince in the tomb of Huy, c. 1300 (Zeuner 1963a:225). In classical Greece, cows rather than horses were used to pull the chariot carrying the priestess of Hera from Argos to the Heraeum (Nilsson 1940:501).

Linear B tablets record deities, shrines, ritual apparatus and offerings (Schoep 1994). It is however interesting that while animals are linked with ritual practices in the tablets from Pylos (mainland), only one Knossian tablet (C 394) refers to a bull in a religious context. Rather than assuming this is an indication of radically different religious practices, Palaima suggests that the tablets may have been produced at different times of the year and thus reflect seasonal variations in the exploitation of cattle (1992:472-3). He further argues that tablet C 902 from Knossos records the provision of grain to be used as fodder for specific cattle (1989:102). The use of such a valuable commodity as food for an animal would

suggest that these were cattle of specific importance, possibly ceremonial or sacrificial (Palaima 1989:102). In ancient Egypt cattle were fattened and even force fed to serve as sacrifices for the gods and food for mankind (Ziegler & Letellier 1977:17; Harpur 1985:33, fig. 3; Ikram 1995:14, 174-5) while among the present day Nilotes, bulky cattle are considered ...*primarily a feast for the eyes, and only secondarily a feast for the stomach* (Coote 1992:254).

Linear B tablets indicate that animals were kept as a source of meat, tallow and tendons (Palaima 1989:87-88). Cheese is listed in the texts from Pylos and although we should assume that this is likely on the whole to refer to sheep and goat cheese, one batch is listed with a male ox, possibly indicating cow's milk cheese (Palaima 1989:88). Horn (distinct from ivory) is also recorded in the tablets from Knossos, in some cases in connection with the construction of chariots. The species of animal from which the horn was derived is not however indicated (Palaima 1989:88). Lists of animal skins and the production of leather goods such as harnesses and shoes are also evident (Chadwick 1987:38; Palaima 1989:87-88) and the term 'for the tanner' occurs in Linear B texts in relation to the construction of chariots and the allotment of oil (Palaima 1989:87 n. 4).

Conclusion

From the evidence surveyed we can conclude that firstly, it is highly probable that wild, domestic and feral cattle were present on Crete throughout the Neolithic and Bronze Age. These animals were probably introduced to the island during the first period of colonisation and imported, from a wide range of locations throughout the Neolithic and Bronze Age. The evidence further indicates that cattle were a key element of the agricultural system. They were exploited both for a wide range of commodities and as a source of motive power.

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1. See Social Trends 1998 vol. 28, p. 78, table 4.8. Lensch (1987:63) states that a hundred years ago, 60% of the population of the USA were employed in agriculture whereas today the figure is less than 5%.
 2. V. Couldrey (1994) Painters of Scotland, Thomas and Lochar, Hong Kong, p. 116.
 3. Regional subdivisions of *Bos primigenius*: the Asiatic *Bos primigenius namadicus*, the European *Bos primigenius primigenius* and the North African *Bos primigenius opisthonomus* (Epstein & Mason 1984:7).
 4. Except for the Indian *Bos primigenius namadicus*, *Bos primigenius* did not inhabit regions north of 60° latitude or south of 30° latitude (Clutton-Brock 1987:63-64).
 5. In 1951 H. Heck at Munich zoo and his brother L. Heck at Berlin zoo succeeded by a process of back-breeding from animals of different stock, in recreating cattle similar to ...medieval representations of the urus (Isaac 1962:200).
 6. Horn width would have excluded *Bos primigenius* from densely wooded areas and although there is no

evidence it is possible that ...there were separate "woodland" and "plains" forms, as in the case of the American bison (Grigson 1969:284-287).

7. The largest known horn core was found at Monte Mario, Rome. It has been attributed to *Bos primigenius primigenius* and has a basal circumference of 50.2 cm and a diameter of 17cm (Epstein & Mason 1984:8).

8. Epstein & Mason (1984:8) believe that *Bos primigenius primigenius* skulls one-third less than the normal size may indicate dwarfing caused by malnutrition rather than a ...separate species of small shorthorned aurochen.

9. Clutton-Brock (1987:64) suggests that Palaeolithic rock paintings may provide us with an indication of geographical variations in pelage.

10. O'Connor (1997:149).

11. Reed (1984:2) excludes from the category of domesticated animals the majority of animals in zoos, circuses, experimental research centres and those ...caught wild and tamed although admitting that it is hard to draw a clear distinction between this final category and domesticated animals.

12. Shorter Oxford English Dictionary defines pelage as A general and collective term for the fur, hair, wool, etc., of a quadruped.

13. The cat is an exception to this rule (Clutton-Brock 1987:25). O'Connor (1997:152) considers the domestic status of the cat as ...highly questionable.

14. By the third millennium in Mesopotamia cattle behavioural patterns were not only observed and recognised but also interpreted as omens of good or bad luck (Buitenhuis 1984:213).

15. I am grateful to G. Witherow & A Campbell, vets based in Edinburgh, for up to date highland cattle information.

16. See also Sunday Mail 5. 5. '96 and Fortean Times (September 1996) vol. 90, 9.

17. Clutton-Brock (1987:64) suggests that *Bos primigenius namadicus* may have been the ancestor of zebu cattle. As zebu cattle originated in India or the Middle East they are geographically beyond the scope of this study and will not be considered in detail (Clutton-Brock 1987:69).

18. See Jarman et al.(1982:146, 150) for a summary of the evidence from Northern Greece. See Epstein and Mason (1984:9) and Clutton-Brock (1987:50-51, 66) for summaries of Near Eastern evidence. See Wendork and Schild (1994), Houlihan (1996:12) and Hassan (1998:104) for Egyptian evidence.

19. In the Tropics where cattle are used primarily as draught animals and milk and manure are seen as having secondary importance, an animal's value as a source of meat is only exploited during times of crop shortage (Wilson 1995:11).

20. The term shorthorn, a translation of the Greek *brachyceros* was first applied to this specific type in a museum catalogue of 1843. The name was later changed to *Bos longifrons*. These cattle are distinguished by short bent horns and the relative length and broadness of the forehead in relation to the shortness of the skull when compared with longhorn cattle (Epstein & Mason 1984:10).

21. The theory that *Bos Longifrons* is the domesticated descendant of a separate species or subspecies of dwarf aurochen has been dismissed (Epstein & Mason 1984:11).

22. These factors feature prominently in a number of Indian myths. In the Legend of Subrahmanya, Subrahmanya's mother is so pleased upon finding him that ...milk flowed by itself from her breasts (Eichinger Ferro-Luzzi 1987:18). Also in the Periya Purana, the cow, overjoyed on seeing her resurrected calf, releases milk (Eichinger Ferro-Luzzi 1987:103). Another legend which states that the river Gosthani originated from the milk flowing from the udders of a cow distressed by an eagle carrying off her calf seems to suggest that extreme stress may cause the same effect (Eichinger Ferro-Luzzi 1987:20).

23. In the scene of the dairy on the 1st century AD. mosaic from a villa near Zliten, Tripoli, in addition to a figure milking a goat, vessels for the storage of milk can be seen on the roof of the hut while on a table to the side cheese-making baskets are visible (Rostovtzeff, M. The Social and Economic History of the Roman Empire, vol. I, Clarendon Press: Pl. LIX,2). To the side of the man represented seated on the ground milking a goat on the early 5th century AD. mosaic from the Palace of the Byzantine Emperors, Istanbul there is a young boy holding a large amphora containing milk (Brett, G., Macaulay, W. J. & Stevenson, R. B. K. 1947, The Great Palace of the Byzantine Emperors, 70, Pl. 30).

24. For other early Near Eastern and Egyptian images see Gressman (1927:53-55, pl. LXXII, LXXIII).

25. Plough marks may be indicative of man-drawn ploughs (Davis 1987:164).

26. In S. Ruggi (director) 'A Horse's World', Channel 4, 15. 8. 98 it was emphasised that the horse was

the fastest and most efficient means of transport for some 4000 years.

27. Traction is also the primary function of cattle in modern India (Lensch 1987:126).

28. Lucas (1985:1-5) describes a similar status attached to cattle in ancient Ireland where cattle raids feature prominently in mythology.

29. Arthur Evans will be referred to throughout as Evans while John Evans, whose work at Knossos focuses on the Neolithic Period, will be referred to as J. Evans.

30. Bread wheat (*Triticum aestivum*) has been identified at Azmak, Bulgaria in contexts as early as c. 4800 BC (Hansen 1988:41).

31. Renfrew (1972:273) argues that cattle and pigs may have been domesticated in the Aegean before the Near East but believes that the cattle of Crete were imported from Anatolia.

32. J. Evans (1964:47) draws attention to what appears to be an internal buttress in a MN house, area BD, Knossos, similar to an architectural feature seen at both Sesklo (Thessaly) and Haçilar, (Anatolia).

33. The 1957 excavations were initiated by Hood and continued by J. Evans from 1958 onwards.

34. All dates are those determined from the calibrated radiocarbon 14 dates from J. Evans' 1957-60 and 1969-70 excavations (Halstead 1982:307, note 1; Broodbank & Strasser 1991:234; J. Evans 1994).

35. J. Evans (1964:140) originally identified stratum X as an Aceramic level of about 20 cm directly above the bedrock. In his excavations of 1969-70 pit x in the central court produced a layer up to 2m thick directly below the EN I level which led him to revise his initial description of stratum X as a 'camp' period and instead assert that the 1957-60 and 1969-70 excavations together represented an Aceramic site covering an area of c. 0.25 ha. Winder (1991:47) argues that the 'camp' area originally identified (1967-60) by J. Evans should be considered as a ... separate site, or at least a separate type of peripheral deposit. Weinberg's (1970:616-617) argument that EN I represents the establishment of a settlement by a new group is based on ceramic and architectural developments which he believes are too distinct to indicate continuation. J. Evans (1971:101) suggested that the distinct interface between these levels may indicate a break in occupation. The agricultural system appears however to evolve slowly and continuously and there is no evidence of change in the floral and faunal types exploited and/or hunted (J. Evans 1968:275; 1971:115; 1994:2, 19; see also Broodbank 1992:49-50).

36. J. Evans (1971:116) estimated that by EN II the site had grown to c. 3 ha.. Broodbank (1992:Table 1) has developed Evans' ideas of settlement growth to estimate population size and growth. The excavations are insufficiently extensive to determine whether the areas excavated represent successive periods of growth of one site or whether they represent movement of the settlement within this area. As Winder (1991:43) says, It is quite possible that the settlement at Knossos remained a small village, drifting over the Hill of Kephala. Whitelaw (1992) also expresses reservations about Broodbank's interpretation.

37. As the buildings of EM IA seem to have been cleared away during subsequent building programs and the only sizeable deposit has come from the palace well, it is difficult to determine how the structures developed during this period. Wilson (1994:35) argues that the ceramic technology developments evident during this period suggest continued development rather than regression.

38. An EM III metallurgy workshop ... engaged in the smelting of copper was excavated at Chrysokamino (Betancourt 1996-7:113).

39. See Warren (1987:47) for a definition of the term 'palace' as used in a Minoan context.

40. Kanta (1983:157-159) compares this type of arrangement with a 19th century AD Cretan houses from Monastiraki where the first floor serves as human living quarters and the ground floor is used for storing and processing produce, sheltering animals and storing feed.

41. See also Hood 1965; 1966; Driessen & Farnoux 1994:54.

42. The Southwest Dodecanese and the Southwest Cyclades were colonised during the 5th millennium (Cherry 1990:164-5, 169-70).

43. Jarman and Jarman (1968:243-246) discuss the difficulty of trying to distinguish between the bones of sheep and goats and other than stating that goats never constitute as much as 20% of the assemblage they conclude that for the purpose of this survey they should be considered as a group. For comparison see Halstead (1981:322) and Trantalidou (1989).

44. See Winder (1986:84) for full list of the 22 taxa represented in the assemblage at Knossos between ACN - EM II. See also Jarman and Jarman (1968:241-3, 252, 255) and Cherry (1990:161-163).

45. See Klein & Cruz Uribe (1984:44-55) for a thorough discussion of the determination of age from the study of teeth.

46. Graphs 1 and 2 are based on the number of bones; the number of identified species or NISP (Klein & Cruz-Urbe 1984:24-27) established by Jarman and Jarman (1968:243 table 2). The MNI or minimum number of individuals is considered by some to be a better method of quantifying results (Chaplin 1971:64, 70-75) as unlike the NISP it represents an absolute. The establishment of the MNI necessitates consideration of factors such as the level of fragmentation, the different numbers of bones making up the skeleton of different animals and the extent to which the evidence is effected by depositional or taphonomic factors. These factors are not taken into account when determining the NISP.
47. The MNI is based on Jarman and Jarman's NISP (1968:261 table 13). The ratio of relative weights depends on the size and bulk of the animals in a particular assemblage. The figure arrived at is fixed and does not take into account variations in bulk size of animals of different sexes and ages and assumes that all bones represent animals slaughtered for meat (Klein & Cruz-Urbe 1984:34). The MNI, like the NISP, should be considered as providing information about the overall faunal trends and developments during the AcN - EN Ib period rather than specific evidence.
48. Broodbank and Strasser (1991:241) consider that following the initial colonisation both animal and human populations may have been boosted by continued immigration.
49. Halstead (1981:323) argues that the relatively low level of decline in the pig population suggests that their food source is relatively constant which would lead one to conclude that they depended to a large extent on kitchen refuse and became more dependent on it as the settlement grew.
50. Sheep and goats usually have litter sizes of 1-2, cattle usually 1 and pigs at least 4 (Bökönyi 1973:175). The importance of young pigs is emphasized by the proliferation of young pig bones discovered at Neolithic Greek sites. Bökönyi (1973:175) says that 70-90% of the pig bones are from animals less than two years old.
51. 18th - 19th century English small holdings depended to a great extent on pigs while in early 20th century Ireland 30-50 acre holdings had about 80% more pigs per acre than 100-200 acre holdings (Fleming 1985:139-140).
52. Jarman et al. (1982:153-4) suggest that the site of Pylaia, central Macedonia may have been a seasonal upland herding station, possibly connected with the lowland site of Vasilika C.
53. Betancourt & Simpson (1992:49) identified evidence to suggest that the island of Pseira, just off the coast of NE Crete, was wooded during the Bronze Age. Charcoal provided evidence of several types of trees including olive, pistachio, oak and pine.
54. J. Evans (1964) identified the exploitation of wood for fuel and timber throughout the EN period at Knossos.
55. As grain samples were only recovered from stratum X it is not possible to determine how crop production developed (J.Evans 1968:269). Halstead (1981:323-4) suggests that during the EN the available land was used for long term cultivation and it was only as a result of the deforestation of subsequent periods that there was an increase in grazing land.
56. At the time of the colonisation of North America and the Caribbean, land clearance and increased human and cattle populations were common factors in a developing economy (Reitz & Ruff 1994:708).
57. Halstead (1981:323-4) describes how cattle and sheep can be grazed on the same land, the cattle grazing on the taller plants, thus opening up the lower pasture to the sheep.
58. The evidence from Sitagroi-Photolivos suggests that about 90% of pigs were slaughtered before reaching maturity while a much higher percentage of both cattle and sheep reached maturity suggesting a wider range of uses than purely as a source of meat (Bökönyi 1973:175).
59. Winder (1986:86-106) records the numbers of identified specimens and the assemblage compositions for 11 phases: AcN, EN I, EN I/II, EN II, EN/MN, MN, MN/LN, LN, LN/MINOAN, EM I/II and EM II.
60. Palaima (1992:474) sites L. G. Allbaugh 1953, Crete: A Case Study of an Underdeveloped Area, 248-249: In 1948 35000-45000 cattle served as the primary source of agricultural traction.
61. Perlès (1992:150) describes specialization in craft production as ... perfectly compatible with the Neolithic level of economic development. Applicable also to agricultural work.
62. Halstead (1981:326) has suggested that caves may have been occupied on a perennial basis by small groups rather than infrequent herders.
63. As neither Mosso (1910:68) nor Pernier (1935:87-88) recorded the sizes of the bones or specific details about the identification and analysis process it is probably wise to accept their accounts of the faunal remains as identifications of genera rather than specific species.

64. Rutkowski and Nowicki (1996): Animal bones were identified at the caves of Pelekita, Stravomyti, Leras, Platyvola, Miamù (see also Taramelli 1887:296-7) and the Dictæan cave (see also Boyd-Dawkins 1902:163-4; Watrous 1982:9).
65. The assemblage ranges from Neolithic - MMI A-B and although just over 45% of bones came from Level II of Area A which coincides with the last century of the 2nd millennium (c. MM IA) the lack of correlation throughout prevents analysis of whether there were changes in the kill age between the Neolithic and Bronze Age. The same applies to juvenile bones; quantities are recorded but not the periods/strata from which they came (Clutton-Brock 1981:693).
66. Davis (1977) for Vaphio Cups.
67. A terracotta equid head from Vrokastro bears a harness in relief and an equid figurine from Ayia Triada bears a painted harness. Both date from the Geometric Period (Guggisberg 1996:142 no. 482, pl. 37.4, HM 6658, 149 no. 523, pl. 39.2, HM 3124).
68. The Vatican Vergil (folio 3r) includes an early 5th century AD representation of the care of cattle in which a figure is crouched behind a cow and is milking it into an open-shaped bowl (Wright, D. H. 1993, *The Vatican Vergil; a Masterpiece of Late Antique Art*, University of California Press, California, p.116).
69. The importance of fermented milk products (clabber or curd) in Western Europe is minimal while they remain important today in areas of Asia, Africa, Central Europe and the Mediterranean basin (Kosikowski 1966:28-29).
70. In Northwest Europe lactose tolerance is relatively high while there is 70% intolerance among black Americans, 98% among West Africans and high levels among Chinese, Thais, South Americans, Southern Italians and Greeks (Sherratt 1981:276-277).
71. Hamilakis (1996:23) suggests a link between the introduction of the stirrup jar during the second palace period and the growing importance and exploitation of oil. There is also a sealing from Mallia which is described as representing a man pressing grapes (*CMS* II 1 420; Poursat 1985:52). It has also been suggested that olives and perhaps vines were being farmed in the Cyclades by EC I (Williams 1996:51).
72. Such bowls have been identified from Palaikastro (eg. AM 1909.386) and Knossos (eg. AM AE 817).
73. From Stratum III, area AC, J. Evans describes the presence of numerous meat bones between the pebbles (1964:172). This bears a striking similarity to the ...floor of pebbles and splintered animal bones Aceramic IV level at Haçilar, described by Mellaart (1970:4).
74. Clutton-Brock (1981:689) describes how some bones from Chios are charred and long bones broken, ...presumably for the extraction of marrow. Bökönyi (1973:175) describes how bones and skulls were broken to remove the marrow and brains throughout Neolithic Greece.
75. In Egypt areas for the slaughter of animals tended to be open or partially covered to allow ventilation (Ikram 1995:98-99).
76. Fully articulated canine skeletons, indicate that whole dogs were thrown into a pit below the Sub Minoan to Early Protogeometric burial X at Vronta, Kavousi (Coulson, Day & Gesell 1981:408-9).
77. Clutton-Brock (1981:689) discusses the probable use of horn cores on Chios. Armitage and Clutton-Brock (1976:329) outline the method for removing horn from the core and the range of uses for horn from the Iron Age to the European industrial revolution. Evelyn (1993:224) describes the composition and removal of horn and its possible decorative and practical uses.
78. J. Evans (1964:132ff) identified c. 1050 objects made of bone from Knossos of which 988 are points. Dawkins (1904-5:265) describes all of the 260 worked bones recorded at Magasá as being either awls, pins or skewers. Warren records four bone tools from the EM II site of Myrtos, all of which have pointed ends (1972:218).
79. In a description of the range of decoration on pottery J. Evans (1968:271) includes incised and pointillé patterns.
80. In the Mesopotamian myth of the Epic of Gilgamesh (KTU VII, v) Enkidu takes the shoulder bone from the dead Bull of Heaven and uses it to strike Ishtar.
81. Hood (1982:674) states that a bone tube with an H shaped perforation from Area A period II (c. MM I) at Chios may represent the mouthpiece of a flute and a perforated phalange a whistle and comments on the similarity between them and those from middle Neolithic Knossos. Megaw (1960) discusses the development of bone whistles from the Upper Palaeolithic to Iron Age in Western and Northern Europe.
82. This is comparable to the discovery of shoulder blades near hearths at Çatal Hüyük which led Mellaart to conclude that they were used as shovels (1962:56).

83. Pernier (1935:87) describes the teeth as being those of wild boars (*sus scrofa ferus*).
84. See Marcus (1990:178) for the use of seals at Hasanlu, NW Iran (Iron II period) to secure leather cords that held leather jar coverings in place and to seal leather bags.
85. For Tiryns see F. H. Stubbings 1972, *Prehistoric Greece*:33, fig. 32.
86. In discussing the house burial from the Iron Age site of Lefkandi, S. Wells suggested that the absence of holes in the gold diadems on the woman's dress suggests that they were glued on (unpublished lecture, University of Edinburgh: March 1998).

Chapter 3: The Representation of Cows and Calves

Introduction

The ease with which we are able to identify specific species of animals in ancient art is partially dependent upon the inclusion of distinctive features such as markings, relative anatomical proportions, horn and tail shapes. Such features are recognised in modern animals, which, despite the effects of domestication, breeding and natural evolution retain many of the distinctive characteristics of their ancestors. Even if we are unfamiliar with the particular breed of animal or plant that the artist represented we are able to compare the representation with a modern equivalent (Gombrich 1968:67). Anatomical features are however only one aspect of the representation of animals and need not necessarily be the only means by which the artist was able to describe a particular species, breed or type of animal.

The degree of anatomical correctness has been interpreted by many twentieth-century scholars as synonymous with the success of the image (Groenewegen-Frankfort 1951:195; Walberg 1986:35-36; Lorblanchet 1989:120). The perception of realism may however vary from one system of representation to another (Goodman 1992:97) and the success of a Minoan image in terms of its ability to represent 'reality' was not necessarily related to the degree of anatomical correctness. A representation of an object, human or animal is never a representation of the whole but rather an approximation of reality (Bailey 1996:293). Representations can only ever represent an aspect or aspects of a person, animal or object and thus anatomically accurate images are not necessarily any more or less informative than unrealistic representations (Gombrich 1968:70-72; Clottes 1989:25-36; Haskovec and Sullivan 1989:66; Goodman 1992:89, 97). For example, when Minoan and Egyptian art are compared, despite our inclination to equate anatomical correctness with realism, it is Minoan art rather than the more anatomically correct Egyptian art that is usually described as being a more realistic representation of nature (Groenewegen-Frankfort 1951:196). This illustrates that the criterion of realism is not ...*the quantity of information but...how easily it issues* (Goodman 1992:97). Minoan art in effect communicates more easily to us than Egyptian art, as it looks the way we expect a representation of nature to look.

It is therefore important to establish why Minoan representations of animals so easily communicate a sense of naturalism to the modern viewer. Although the emotional response or the perceived meaning of the image during the Bronze Age can not be equated with our own, in identifying the key elements of the image we can more thoroughly understand what is

represented. This in turn can lead to a fuller understanding of potential meaning.

Stasis and movement, scale, position in the pictorial field, orientation, posture and gesture, are all elements in communicating type and situation in representations of the human figure. (Morgan 1997:31)

The same defining factors are also evident in the representation of animals.¹ Although ancient representations of animals, which we perceive to be generalised, may be intentionally ambiguous², features comparable to those outlined above may also have served as distinguishing factors. When considering the question of the representation of animal movement and behavioural traits it is however important to distinguish between natural and symbolic gestures.³ For example, the potential meaning of the natural gesture of a female animal suckling her young is distinct from the symbolic gestures evident in heraldic images.

This chapter will address the issues surrounding what is represented in Minoan images of the cow and calf. In addition to anatomical details, the representation of behavioural traits will be discussed. Before this, however, we shall consider the context of the images in terms of the function of the objects they decorate and the compositional restraints of the media. Ambiguous and hard-to-define images will also be discussed in order to emphasize the problems of identification and therefore the importance of identifying the representational details in any given group of images.

The Cow and Calf

Research into the depiction of cattle in Minoan art has concentrated on representations of interaction between men and cattle, in particular, the images of bull sports. This has been fuelled in recent years by the discovery of fragments of wall paintings at Tell el-Dab'a, on the Nile Delta. Among these frescoes are images of confrontation between men and cattle, which it is argued exhibit Minoan characteristics (Bietak 1992, 1996; Bietak *et al.* 1994). The extent to which research into Cretan representations of cattle in glyptic focus on this specific relationship is reflected in *A Bibliography for Aegean Glyptic in the Bronze Age* (Younger 1991); of the sixteen references to works relating to cattle imagery, ten deal specifically with bull sports (Younger 1991:100).

This emphasis detracts from the prominence of other types of image including the cow and calf. Of the eighty-five identified representations of animals with young on Bronze Age seals and sealings, fifty-five are of cows and calves (see Appendix A) and of the sixty-six

representations of pairs of cattle on seals and sealings from known Cretan contexts, nineteen are of cows and calves (29%). In Younger's bibliography however the subject receives only one brief entry (1991:10).⁴

This chapter will discuss the twenty-four representations of cows and calves that have been recovered from Cretan contexts. The group consists of nineteen seals and sealings [Nos. 6-24], a faience plaque [No. 1], two larnakes [Nos. 2 & 3], an ivory plaque [No. 4] and an ivory mirror handle [No. 5].

There are a further seventeen depictions of cows and calves in glyptic from known non-Cretan contexts and nineteen of unknown origin. These will be referred to for comparison.

Faience Plaques

The faience reliefs were recovered from the temple repositories at Knossos (Evans 1921b: 510-512, figs. 367). The group consists of two complete plaques; one representing a cow and calf [No. 1] the other a goat and two kids [No. 61]. An additional fragment depicts a suckling calf [fig. 3.1] (Evans 1921b: 512, fig. 369). A fragment of an udder and the similarity between the fragmentary calf and the calf represented with the cow [No. 1] suggests that it was part of a similar group.



Fig.3.1

Evans believed that these plaques were originally mounted on the back wall of the shrine (1921b:512). More recently it has been suggested that they were used to decorate furniture or objects, possibly of wood, as attested in Linear B furniture descriptions (Foster 1979:115). The plaques were originally dated by Evans to the MM period (1935:552). Foster has subsequently dated them to MM IIIB (1979:154-155) while Panagiotaki (1995:137) believes

them to be LM IA.

Green and dark red to brown glaze is still visible on all the plaques. The cow and calf are piebald: dark red with brown markings. Linear B tablets from Knossos record cattle of black, white, wine-red and mixed colours (Palaima 1989:89). Details such as the cow's udders and tongue are clearly defined. The nanny goat's back, face, neck and legs are green. One of the kids is suckling while the other stands regardant to the far side of the mother, *...bleating for her turn* (Evans 1921b:510).⁵ On both plaques the eyes, heads, legs and pelage markings are outlined in black (Foster 1979:89-91; Panagiotaki 1995:142).

Clay Larnakes

During the LM III period the clay larnax, probably derived from wooden predecessors, became a frequently used burial vessel (Watrous 1991:285). Many were decorated with scenes and motifs relating to ritual and sacrifice. No. 2, a tub larnax from Alatsomouri near Gournia, has been dated to LM IIIA:2 - B (Alexiou 1953; Kanta 1980:143, pl. 56,1; Betancourt 1985:162, pl. 26f). It was discovered with two other tub-shaped sarcophagi in the elliptical chamber of a tomb. In addition to the sarcophagi, the tomb contained a shallow pit of human bones over which stood a tripod table and a selection of clay and stone vessels. Of particular note was a pyxis containing several beads and two plain gold rings (Alexiou 1954; Kanta 1980). On the front is a painting of two addorsed animals. The animal on the left is distinguishable by the bulk of the body and shape of the horns as bovine, while the presence of a suckling calf suggests that it is a cow. The animals are painted in monochrome and although internal texture is not indicated, hairs are represented jutting from the necks and tails. A reserved band around the eyes of both the adult and young serve to distinguish them from the monochrome bodies while the mouths of both animals are painted open. In the case of the cow adult the tongue is represented as protruding and the ears are added in outline.

No. 3 is a clay larnax from tomb 11, the LM III A-B cemetery, Armenoi (Tzedakis 1971:216-17). One side of the sarcophagus is decorated with a scene of three men hunting animals. All three animals are accompanied by suckling young (Watrous 1991:300). All the animals are painted in solid monochrome but the distinctive shape of the horns and bodies distinguish the upper two animals as bovine and the bottom animal as a goat. As is the case in No. 2, the animals are represented with bristly tails. The two cows have been struck by projectiles. The man at the top of the image appears to be casting a net while the middle figure holds what is possibly a noose which is caught around the base of the horns of the cow to his left (Watrous

1991:300). The figure below appears to be holding a double axe and Tzedakis suggests that this element and the presence of two peacocks in the scene indicate that the image has religious significance (1971:218; Watrous 1991).

Ivory Carvings

No. 4, a fragmentary ivory plaque, was discovered in pit six of the Mycenaean grave enclosure, Phourni (Sakellarakis 1972:404; Sakellarakis & Sakellarakis 1997:figs. 853 & 855). All the enclosure burials have been dated to LM IIIA (Sakellarakis & Sakellarakis 1997:189). The plaque was originally thought to be the upper section of a mirror handle but its size and flatness make this unlikely (Poursat 1977b:19; Sakellarakis & Sakellarakis 1997:732).⁶ Sakellarakis and Sakellarakis suggest that the function of the plaque may have been related to the other pieces of ivory found in the pit (1997:732). As well as a mirror handle and a comb there are some sixty fragments and numerous flakes that probably represent the remains of ivory inlays that decorated now decomposed, possibly wooden, objects (Sakellarakis & Sakellarakis 1997:740). The plaque is indeed comparable to four ivory plaques carved with lions and one depicting a wild goat from Burial Building 3, Archanes which probably decorated a wooden container (Sakellarakis & Sakellarakis 1997:734-7, figs. 859-862). Although the plaque is fragmentary it is possible to identify stocky hindquarters, a long tail, the curving neck, a section of the body and udders of a cow and the foreleg of a suckling calf.

No. 5, a fragmentary ivory mirror handle still attached to the bronze disc of the mirror (Poursat 1977b:19; Sakellarakis & Sakellarakis 1997:731-2, figs. 854, 856), was recovered from the side chamber burial of Tholos Tomb A, Phourni (Sakellarakis & Sakellarakis 1997:158-168). It was discovered between the sarcophagus and the south wall of the room. The burial has been dated from the accompanying objects to LM IIIA1. The predominance of bronze domestic vessels and fine jewellery and the absence of weapons have led Sakellarakis and Sakellarakis to conclude that the occupant of the sarcophagus was a woman of high social status (1997:168).

The handle is fragmentary but based on the evidence of all other Creto-Mycenaean ivory mirror handles it is assumed that the same subject, a cow suckling a calf, was represented on both sides (Poursat 1977b:18-19). On one side the cow faces to the right, on the other to the left. In both case the cow stretches her head and neck down and around to the calf. On the first side the udder and suckling calf are clearly visible. On the second the calf and the head

of the cow are not preserved although the hindquarters, long tail and part of the neck of the cow are visible and bear a striking resemblance to those on the first side.

Sakellarakis and Sakellarakis (1997:732) describe the base lines of both Nos. 4 and 5 as being composed of bands of palm-leaves. Poursat (1977b:20) categorises the base motif of No. 5 as *feuillage*, but in a more detailed description says that the base is composed of ...*deux rangées de feuilles arrondies*. As Poursat's description suggests, No. 5 is very different from the other Creto-Mycenaean ivories which he describes as incorporating the palm-leaf motif [fig 3.2] (Poursat 1977a:nos. 300, 331 & 332, pls.XXXII & XXXV; 1977b:pl.VIII, 7).

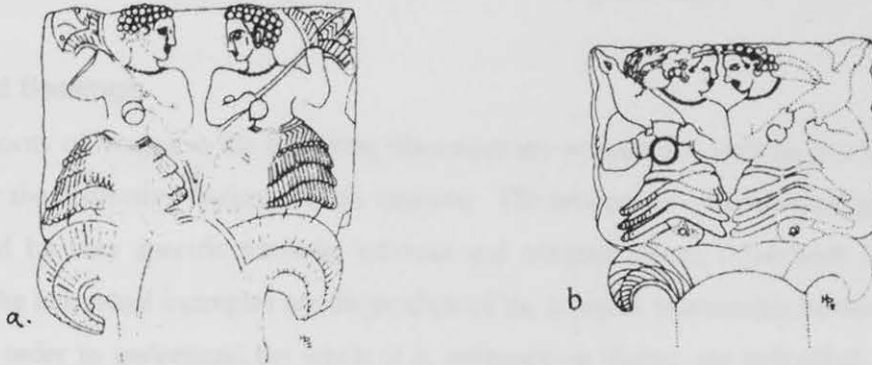


Fig. 3.2

In these examples long tapering fronds are represented fanning outwards below the image while in contrast, the bases of Nos. 4 and 5 are composed of repetitive rows of vertical stumpy shapes.

Poursat (1977b:20) and Sakellarakis and Sakellarakis (1997:732) make a further comparison between the motif forming the base line of Nos. 4 and 5 and a motif that appears on Minoan stone lamps [fig. 3.3].



Figs. 3.3

Warren (1969:54, P. 302-4) however describes this motif as a *Petaliform pattern*. Although the baselines of Nos. 4 and 5 resemble more Warren's *Petaliform pattern* than the fronds of a palm, they do not exude the sense of outward growth common to plant-derived motifs and instead appear static and solid.⁷ It is therefore more likely that they are intended to indicate a rural, rocky baseline, as they do on the faience plaque of the nanny goat and kids [No. 61]

(Evans 1921b:511; Foster 1979:89). The use of this motif to describe a rural setting is also evident in glyptic (Evans 1921b:716, fig. 539c, 809, fig. 528; *CMS* II5 259 [fig. 3.4]) and wall painting (Evans 1921b:265, pl. IV [fig. 3.5]).

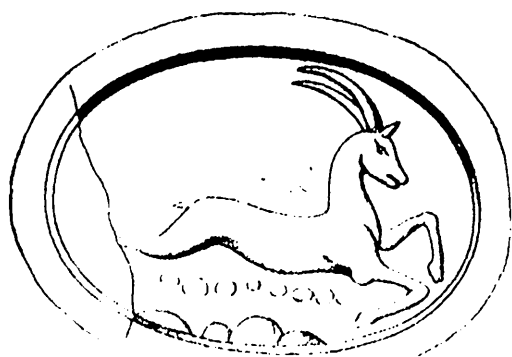


Fig. 3.4



Fig. 3.5

Seals and Sealings

As the majority of images in the following discussion are on seals and sealings it is important to consider the distinctive features of this medium. The production of small-scale glyptic art is governed by very specific intrinsic, inherent and external factors (Gombrich 1968:56). Although the individual examples are the product of the complex relationship between all the factors, in order to understand the whole it is necessary to discuss the individual elements separately.

The earliest Cretan evidence for the manufacture and use of seals dates from the LN/EM period (Younger 1989:53; Weingarten 1990:105 n.1). Seals were originally introduced into Crete from the Near East and Egypt and the subsequent stylistic and thematic changes are indicative of both indigenous Cretan developments and continued interconnections with the Near East and Egypt throughout the Bronze Age (Groenewegen-Frankfort 1951:191; Goodison 1989:3; Immerwahr 1990:26, 29, 35). The majority of preserved seals are made of stone although a small proportion of bone, ivory, glass and metal examples have also survived.

Sphragistic Uses

The earliest Cretan impressed sealings date to the EM II period (Weingarten 1990:105 n.1; Betts 1997:54; Sakellarakis & Sakellarakis 1997:671). The discovery of sealings, associated with Linear A and B tablets and usually found in administrative contexts, indicate that seals were a key element of the Bronze Age bureaucratic apparatus. They were used in administrative processes relating to the storage, recording, manufacture and distribution of commodities and the distribution and recording of information (Weingarten 1983:46; 1990;

Aravantinos 1984:43-44; Ferioli & Fiandra 1990:223; Palaima 1990:83-4). Seals were used to secure objects made of wood, basketry, textiles, animal skin and clay (Weingarten 1983:38-42; Betts 1997:63-64). In addition to sealings, noduli and roundels were also used. Noduli are small pieces of clay bearing impressions that were not attached to or used to seal anything. It has been suggested that they served as mini-documents or dockets (Weingarten 1989:42; 1990:108). Roundels are larger discs of clay (MM II - LM IB), bearing multiple impressions and in some cases, Linear A inscriptions. Although their function is unclear, they are usually found with tablets and noduli and are therefore assumed to have been used in administration (Hallager 1990; Palaima 1990:92, 95; Betts 1997:64).

It has been suggested that seals were identified with individual officials or offices (Blasingham 1983:16-17; Aravantinos 1984:44-45; Weingarten 1989), possibly relating to particular workshops, families or merchant groupings (Weingarten 1983:45). The choice of image may have reflected specific users or wearers, in a manner comparable to a modern-day coat of arms or badge of office (Evans 1894:301; Goodison 1989:2). Hallager and Hallager suggest for example that the image of the bull on seals and in other media was a symbol of Knossian power and control during the New Palace Period (1995). Groenewegen-Frankfort believed that seals were used by *...religious or semi-religious functionaries* and that the images were themselves largely religious (1951:212). Others have identified distinctions between the images that appear on sealstones that were probably intended to serve as ornaments and those used in administration (Marcus 1990).

Decorative function

Seals were used as jewellery (Younger 1977:146-158). Cretan tombs provide examples of sealstones incorporated into necklaces, bracelets and possibly finger rings and anklets (Younger 1977). Irrefutable evidence comes from the MMIIB- IIIA sanctuary at Anemospilia where a seal was found on the left wrist of one of the human skeletons (Sakellarakis & Sakellarakis 1997:692). Lentoids are represented, worn on the wrists of the cupbearer from the Processional Fresco, Knossos (Evans 1928: pl. XII; Immerwahr 1990:88, pl. 38, Kn No. 22) and a marching warrior, from a fragmentary miniature fresco, Knossos (Cameron 1967:67, fig. 7B and C, pl. Ivd; Younger 1977:147).

Although there is evidence that particular types of seals were used for particular purposes, it is also probable that a single piece could simultaneously or, through the processes of secondary usage and lateral cycling, serve several functions. For example, among the

sealstones used as votive offerings at shrines, Younger identifies both contemporary and older stones, ...*much worn by hard use* (1997:142; Betts 1997:61-62; Blasingham 1983:13). The inclusion of older sealstones among funerary goods suggests that they were valued as heirlooms (Goodison 1989:2) and possibly associated with individuals. Indeed, funerary evidence has shown that some were considered of sufficient value to be kept in boxes (Younger 1977:144-145; Betts 1997:61-2). These examples illustrate the importance of context in determining potential meaning (Beardsley 1958:150).

Talismanic function

It has been argued that the use of talismans was wide spread in Minoan society (Platon 1966:197). Younger distinguishes between talismans and amulets (1977:149). In the case of amulets he claims it is the shape, form and material of the stone that is important while talismanic value is determined by the engraving. The term 'talismanic' will however be used here to describe an object that has ...*magical properties*, a definition which allows for both notions of protection from evil or harm (amuletic) and the procurement of good fortune (Bloedow 1992:22-23; Onassoglou 1985).

Some argue that it is schematic style and technique that distinguishes the talismanic from other stones (Boardman 1970:43-44; Onassoglou 1985; Betts 1997:66). This definition is however inadequate in that it excludes naturalistic images, purely on the grounds of style and technique rather than taking into account the relevance of the subject to the potential talismanic function of the stone (Evans 1935:446, 541; Betts 1974:310; Bloedow 1992; Sakellarakis & Sakellarakis 1997:671). For example, Evans suggested that the representation of sea creatures may be linked to the good fortune of fishermen while images of speared animals, including that of the calf, were intended to bring good luck to the hunter (1935: 446, 541). A specific example of the relationship between the image and talismanic function is provided by Younger (1977:144; *CMS I* 144, 145). He describes how two carnelian lentoids of about the same size, each bearing the image of a 'Potnia Theron'⁸ flanked by animals were discovered to either side of the entrance to chamber tomb 515, Mycenae and concludes that they served as talismanic guards.

It should be stressed that individual seals can rarely be classified as specifically sphragistic, decorative or talismanic (Betts 1974:309; 1997:65-66; Younger 1977:148; Goodison 1989:2). Just as the distinction between the religious and secular is rarely ever distinct, individual stones may embody multiple function and meaning.

Representations of Cows and Calves

Nineteen images of cows and calves have been identified on Cretan seals and sealings have been identified [Nos. 6-24]. The group consists of fifteen seals [Nos. 6-12, 14-18, 21, 23 and 24], three sealings [Nos. 13, 19 and 20] and an incomplete stone matrix used probably for the production of gold lentoids [No. 22] (Younger 1979a:264-5).

The following were recovered from datable contexts:

	<i>Publication</i>	<i>Date</i>	<i>Provenance</i>
No. 9	<i>CMS</i> II4 159	LM III B1	Gournes, ChT. 1
10	II4 160	LM III B1	Gournes, ChT. 2
11	V 298	LM III B	Maleme, Tholos T.
12	VS 1A 103	LM III B	Khania, ChT. 1
13	VS 1A 156	MM III - LM I	Khania Kastelli, room
19	<i>Betts</i> 13	LM III A 1½	Knossos
20	HMs 221 (<i>KSPI</i> R10)	LM I - III	Knossos, Palace
22	AM 1938.1087	LM II A - III A	Knossos, Lapidary's workshop
24	HM Σ-K 2250	LM III A	Arkhanes, Phourni, Tholos T. B

Both Nos. 9 and 10 were found in LM III B1 contexts but on stylistic grounds Younger (1979a:263) dated their manufacture to LM IIIA 1½. No. 11 is badly corroded but Younger (1979a:263) makes a convincing comparison between this and *CMS* I 9-11 and V 593, all of which come from MH - LH III A2 contexts.

A further image of a cow and calf is described as being represented on an unpublished crystal lentoid from a LM III A:2-B (?) tomb, Armenoi, now held by Chania Museum (Younger 1977:146). As the author has not seen this example, it will not be included in the current discussion of what is represented. It will however be mentioned in the concluding chapter in relation to the relevance of find contexts.

Nos. 6-8, 14-18, 21 and 23 are from undated Minoan contexts and are assigned to the LM period on stylistic grounds.

	<i>Publication</i>	<i>CMS Dating</i>	<i>Other Dating</i>
No. 6	<i>CMS</i> I 509, Crete	New Palace	LM (Younger:1988)
7	II3 88, Knossos		LM (Younger:1988)
8	II3 288, 'Kaminaki Lasithiou'		LM (Younger:1988)
14	VII 236, Crete	LM III A1	LM (Younger:1988)
15	VIII 85, Crete	LM III B	

16	VIII 91, Crete	LH IIIA/LM IIIB LM (Younger:1979a) ⁹
17	XIII 28, Crete	LM LM (Younger:1988)
18	AM 1938.1032 (CS 243), Knossos	LM I (CS)
21	AM 1938.1033, Crete	LM ¹⁰
23	HM G 3309 (CMCG 303), Knossos	New Palace – LM (Younger:1988) Post Palatial (CMCG)

The CMS records seventeen examples of the cow and calf image on Bronze Age glyptic found in non-Cretan contexts.¹¹

	<i>Publication</i>	<i>Date</i>	<i>Provenance</i>
No. 25	CMS I 20	LH III B2-C1 LH IIB (Younger 1985)	Mycenae, House of the Warrior Vase.
26	I 67		Mycenae, ChT.
27	I 104		Mycenae, ChT.
28	I 125	LM IB (Younger 1985)	Mycenae, ChT.
29	I 140	LH II B	Mycenae, ChT.
30	I 291	LH I	Pylos, T.
31	I 364	LH III B2-C1	Pylos,
32	I 376	LH III B2-C1	Pylos, Palace
33	I sup 28	LH III A1	Prosymna, T.
34	I sup 178	LH III B2-C1	Pylos, Palace
35	V2 317	LH III C	Krissa, ChT.
36	V2 663	LH IIB (Younger 1985)	Megalo Kastelli (Thebes) ChT.
37	VS IB 34	6 th -5 th century B.C.	Limnos, Hephaisteia
38	VS IB 136	LH II-III A1	Anthia, tholos
39	VS IB 165	Middle Geometric	Ano Masaraki, Sanctuary
40	VS IB 472	Archaic	Tokra (Libya)
41	IX 156	Mycenaean	Antioche

There are a further nineteen of unknown origin, some of which have been dated on stylistic grounds.

	<i>Publication</i>	<i>CMS Dating</i>	<i>Other Dating</i>
No. 42	CMS I sup 110		
43	VS IB 95	LH II-III A1	
44	IX 155	'Mycenien (Crète et Continent)'	
45	IX 194	'Mycenien (Crète et Continent)'	
46	IX 24D		
47	X 138	LM/LH	
48	X 216	LM/LH	LM II(Younger:1985)
49	X 217	LM/LH	LM II(Younger:1985)
50	X 255	LM/LH	LM (Younger:1988)
51	XI 60	LM/LH II-III A1	
52	XI 188	LM/LH II-III A1	
53	XI 293	LM/LH II-III A1	
54	XI 332	LM/LH II-III A1	1600-1550 BC. (Younger:1993)
55	XI 344	LM/LH II-III A1	

56	XII 306	LH III A/B	
57	XII 14D		
58	XIII 29	LM/LH	
59	XIII 30	LM/LH	1600-1550 BC. (Younger:1993)
60	XIII 133	LM/LH	

The earliest representations of suckling in Cretan art date to MM II-III [Nos. 13 and 88] and the subject is depicted throughout the Aegean until LM/LH III. Younger (1979a:263) states that naturalistic rendering of the cow and calf probably ceased on Crete after LM III. Sakellarakis and Sakellarakis (1997:732-733) suggest that the image is a Minoan invention based on the evidence of the LM IIIA1 ivory mirror handle [No. 5] which predates by several centuries comparable images in ivory from Nimrud and Arslan Tasch. They further suggest that the presence of two ivory carvings of this image found at Archanes, unparalleled in Creto-Mycenaean ivory carving, possibly indicate that the image was created in an ivory workshop at Archanes (Sakellarakis 1997:733). These theories are however confounded by numerous earlier examples of the image in media other than ivory from the Aegean, Near East and Egypt (Buchanan 1954:144, *see below*) and the pre-LM IIIA 1 examples cited above.

Thirty-one representations of other animals with young have been identified (listed in full in Appendix A). The table below quantifies them in terms of subject matter and origin.

	Nanny & Kid(s)	Lioness & cub	Bitch & pups	Doe & fawn	Ewe & lamb	Sow & piglets	Quadrup ed & young	Total
Crete	9	3	1	1	1	0	4	19
Non- Cretan Context	0	3	0	1	0	1	2	7
Unknown Origin	2	1	1	1	0	0	0	5
Total	11	7	2	3	1	5	1	31

The Process of Identification: Naturalism

The blanket term ‘naturalistic’ is often applied to the image of the cow and calf (Evans 1935:552-3; Younger 1979a:263).¹² As discussed above, the term is ambiguous and requires clarification. In order to understand more fully what is represented, it is essential to establish

the extent to which these images offer a ...*faithful representation of nature*.¹³ It is vital to consider the degree of zoological, anatomical and behavioural accuracy as well as the recurring compositional elements and dynamics, fundamental to the sense of movement and interaction.

Animal Behaviour

A comprehensive understanding of domestic animal behaviour is seen today as an essential aspect of animal husbandry as it allows those concerned to maximise productivity and recognise the early signs of individual or group problems. This was probably also the case during the Bronze Age. In the following section, the details of the Bronze Age images will be compared with known cow and calf behavioural traits in order to determine the extent to which the images are indicative of specific aspects of the relationship between the mother and young and therefore evidence of an understanding and recognition of animal behaviour.¹⁴

The cow, usually a herd animal, finds an isolated secluded location to give birth¹⁵ and, for several days after, keeps the calf hidden while she is grazing (Fraser & Broom 1997:213, 219, 224, 232; Hermann & Stenum 1982:4-6; le Neindre 1982:27, fig. 4).¹⁶ This behaviour is not common to all domesticates; foals, lambs and piglets, for example, remain with the mother from birth (Fraser & Broom 1997:224, 232; Houpt 1991:180). In a modern domestic situation, where cows are restricted to a cattle yard or stall to give birth, they tend to become very protective of their calves, threatening and even butting away cows, calves and herdsman who encroach on their territory (Haupt 1991:36, 45-46; Hermann & Stenum 1982:8; le Neindre 1982:27). Studies have shown that for the first week the calf spends most of its time within a ten metre radius of the cow (le Neindre 1982:26, fig 2).

All the Cretan images of cows and calves show the pair apart from the herd. In the case of the seals and sealings this is due in part to the restricted size of the objects decorated. The isolation of the pair also however serves to emphasise the specific relationship between the cow and calf. During this period the bond between the mother and young takes precedence over the relationship of the cow with the herd, the presence of the calf redefining the cow. Bronze Age iconographic categorisations of animals have been shown to be flexible and the status of the animal may therefore vary from image to image. For example, Marinatos (1993:196-7) has shown that the bulls could be represented as both the aggressors and prey.¹⁷ Where cattle are represented interacting with other cattle (as in the image of the cow and calf) and animals or man the emphasis is on the exact nature of the relationship and the scene is

often represented in isolation. In some cases the size of the field would allow for larger groupings, as for example, on the Vaphio Cups (Davis 1977). Here however, the frieze is composed of a series of separate images of conflict. These individual scenes may be viewed independently or as an integral part of the overall predator/victim theme of the cups on which the cattle are represented as both aggressors and victims. The group of faience plaques from Knossos [Nos. 1 and 61] provide a similar scenario in that the image of the cow and calf can be considered in isolation or within the wider context; as one of a group of mother and young images. In this case, the categorisation of mother and young goes beyond individual species. In No. 3 however, the layers of interaction are more complicated. We are presented with both the interaction between the mother and young and the interaction between the hunter and prey.

Hiding her young is an essential aspect of the cow's defense system as the new-born calf, like the kid, takes between one to two hours to stand (Haupt 1991:179; le Neindre 1982:25, table 1). Although parturition is not represented in Bronze Age art it is possible that No. 27, in which the calf is depicted sitting, may represent the first few hours of life. Evans (1921b:696; 1935:563) suggested that No. 66 represents parturition. Although the image is fragmentary it is possible to identify the kid as standing and the scene is therefore unlikely to represent the moments following birth. The vulnerability of the calf, especially during the first few immobile hours, is emphasised by comparison with the foal, which stands immediately and relies on its ability to move rapidly to stay by its mother and thus avoid danger. The vulnerability of the cow and calf is the subject of Nos. 38 and 45 where suckling cows are attacked by lions.¹⁸ No. 84 shows a figure attempting to lasso a suckling ewe, while No. 3 shows two men hunting cows with calves. *CMS* II7 30 [fig. 3.6] shows a man holding two kids up to two bleating goats.



Fig. 3.6

These images reflect the vulnerability of animals with young and the readiness of man and other animals to exploit the situation.

The bonding process begins immediately after parturition as the mother begins to lick the foetal fluids from the calf. During this time both animals produce a range of specific noises (Haupt 1991:29, 179; Hermann & Stenum 1982:6-7). The cow issues loud, open-mouthed bellows while she is grooming the calf and closed-mouth softer grunts at other times. These rise in volume if the calf wanders away (Fraser & Broom 1997:215,219). The calf makes a drawn out 'baa' noise to indicate want (Brownlee 1954:52). Except for the two painted larnakes [Nos. 2 & 3] and two fragmentary glyptic examples where the mother's head is not preserved [Nos. 16 & 19], all the Cretan examples of this image represent the cow turning her head down and around to the calf. In the seventeen cases where it is possible to distinguish the features of the cow's head [Nos.1, 2, 7, 8, 9, 12, 13, 14, 15, 17, 18, 20, 21, 22 & 24] all are represented open-mouthed and in nine of these images the tongue protrudes [Nos. 1, 2, 7, 8, 9, 12, 13, 14, 17 & 20]. Licking is a visible action and therefore immediately recognisable. Bellowing and grunting are however audible actions and as such are less immediately recognisable when depicted in a silent medium. The open mouth however probably serves not only as an indication of grooming but also of the specific and distinctive noises that accompany the action.

Cattle are frequently represented vocalising and in the majority of cases it is possible to identify the specific context. In Cretan glyptic it is in scenes where they are threatened or attacked that cattle are most frequently represented bellowing. This is symptomatic of the necessity to transmit knowledge of imminent danger in *prey species*, such as cattle (Haupt 1991:29). Lion attacks feature most prominently in this category (CMS II1 419; II3 44, 60 [fig. 3.7], 129, 173, 283; VS IA 140; VIII 89; X 131, 241, 253; XI 170, 211; XII 251; XIII 26). There are also scenes of confrontation with man (CMS II3 105[fig. 3.8]; XIII 35; CMCG 357).¹⁹

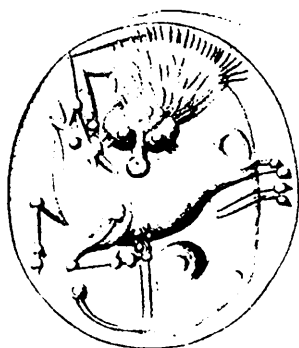


Fig. 3.7

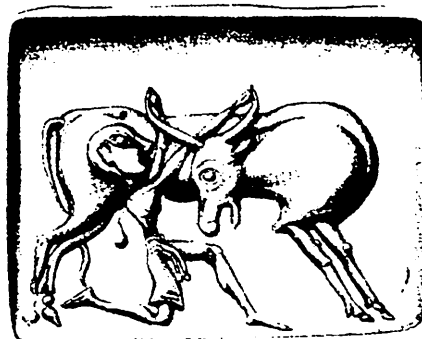


Fig. 3.8

Even when man is not actually represented in the image, a spear protruding from the back of a bellowing animal (CMS II2 60; VS IA 153, 154; VS IB 232; VII 261; IX 119; XI 223,

318[fig. 3.9]; (CS 301) indicates a human attack. Both captured and maimed cattle are represented bellowing (tethered: CMS VS IA 173).²⁰ Vocalisation is also an important aspect of the interaction between cattle in groupings other than the cow and calf (CMS IV 256; IX 130 [No. 106], 133).



Fig. 3.9

The representation of vocalisation is not confined to glyptic²¹ or indeed cattle.²² Human vocalisation is also represented in a wide variety of specific situations.²³ The quantity and range of evidence suggest that the representation of vocalisation is an important element of the visual description of the actions and interactions of both humans and animals.

Once the new-born calf is standing it begins 'teat-seeking', nuzzling along the mother until it locates the udders and teats, a process which can take several hours (Fraser & Broom 1997:220, 231; Hermann & Stenum 1982:13; le Neindre 1982:25, table 1). The new-born calf will suckle between five to ten times a day which reduces to about three to six times a day by the age of six months (Fraser & Broom 1997:232). Natural weaning occurs between eight to eleven months (Haupt 1991:180). In the majority of cases discussed here the calf is represented suckling or at least with its muzzle towards the area of the udders. In No. 8 the calf is facing the wrong way while in No. 9, although the body is facing the right way, the calf's head is facing towards the middle of the cow's underside. No. 23 is similar to No. 9 except for the calf's head pointing back towards the mother's. All of these images may represent the calf's search for the udder or the mother licking the calf at a time other than during suckling.

Grooming and licking occurs frequently during the first hours and although the length of grooming sessions gradually decreases, the cow continues to lick and groom her calf until it is weaned (Hermann & Stenum 1982:8, 18; le Neindre 1982:27). Licking and grooming serve not only to reinforce the bond and stimulate awareness of the mother but also to stimulate urination and defecation (Fraser 1974:150; Fraser & Broom 1997:232; Hermann &

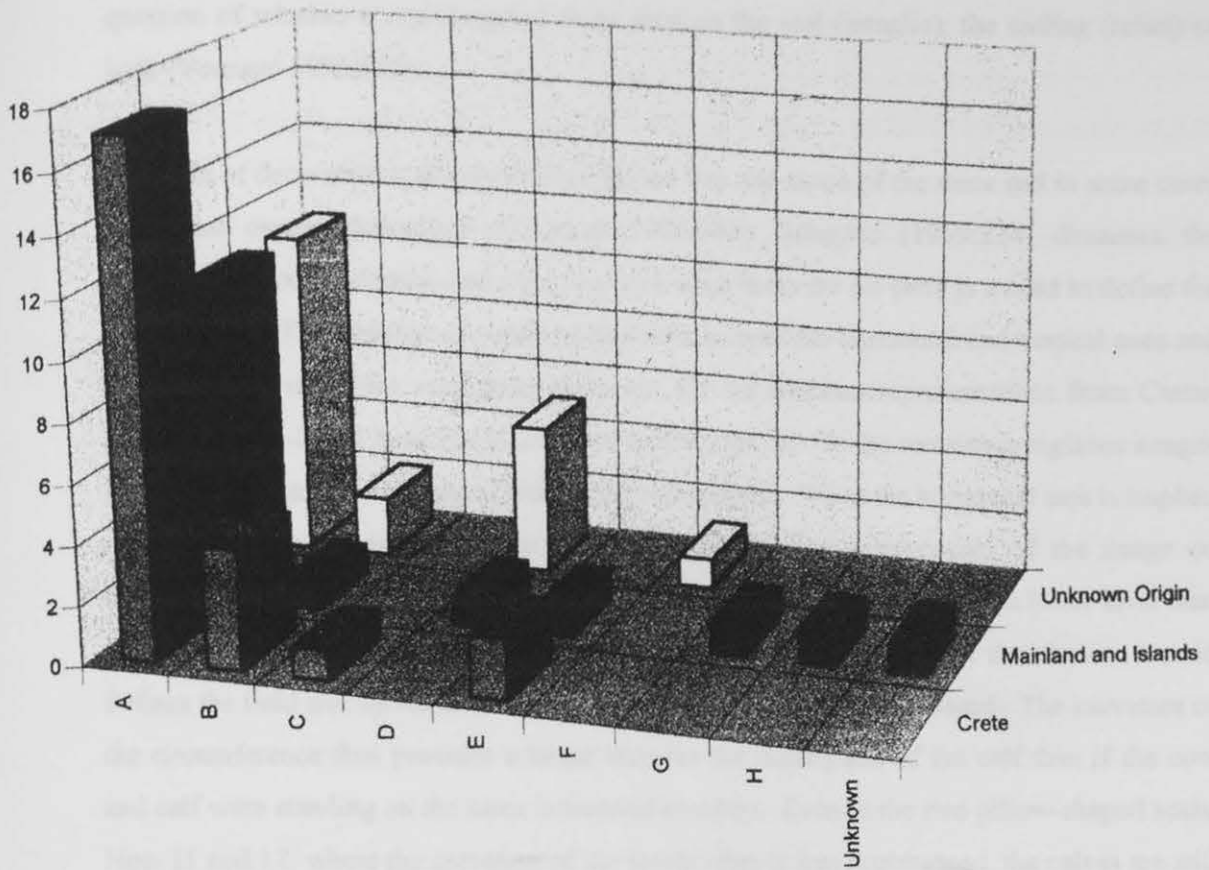
Stenum 1982:20; Houpt 1991:180). The cow will often lick the anogenital area of the new born calf to stimulate the secretion of meconium, the substance that fills the large intestine of the foetus (Hermann & Stenum 1982:8). Defecation and urination may be indicated in Nos. 6, 7, 9, 10, 12, 17, 20 and 24 where, in contrast to the cows', the calves' tails are raised, a practice common to both calves and older cattle during defecation.²⁴ The raised tail may also however reflect tail wagging which often accompanies suckling (Haupt 1991:180)

Pose Types

The cow and calf usually stand in a ...*parallel-inverse position* during suckling (le Neindre 1982:26; Fraser & Broom 1997:221). The same distinctive pose is prominent in Bronze Age representations. In the following discussion of poses a system based on Younger's (1988,1993) categorisation of animal poses in glyptic will be used. As however this chapter focuses specifically on the cow and calf rather than quadrupeds in general, analysis of the cow and calf pose types requires a wider variety of variations than Younger's classifications allow (see Appendix B).²⁵ For example, Younger's PT 18B is here subdivided into PT A 1, A2 and B.

Thirteen of the twenty-four examples from Crete [Nos. 1, 4, 5, 7, 10, 11, 14, 15, 17, 20, 21, 22 and 24] conform to PT A1. Nos. 9, 12 and 23 conform to PT A2 and No. 16 to either PT A1 or A2.²⁶ There are four examples of PT B [Nos. 6, 13, 18 and 19], two examples of PT E [Nos. 2 & 3] and only one of PT C [No. 8].

The frequency of pose types in the Bronze Age glyptic examples of unknown origin and non-Cretan contexts corresponds closely to those of Crete. Eleven from non-Cretan contexts conform to PT A1 and 1 each to PTs B, D and E, G and H. In No. 31 the cow's head is not preserved and it is therefore not possible to determine whether it conforms to PT A1, D, E or F. Of the remaining nineteen examples of unknown origin, eleven conform to PT A1, two to PT B, five to D and one to F.



Graph 3.1: Pose Type Distributions

In total thirty-five of the sixty representations of cows and calves conform to PT A1 and as graph 1 illustrates the distribution appears even throughout all three categories of provenience. PTs, A1, A2, B, D, E and F show the calf suckling or teat seeking and account for all except three of the sixty images, emphasising the importance of this particular aspect of the relationship between the cow and calf.

Categorisation by pose type can be misleading in some respects as the stick drawings are not only summary, but also remove the image from the field of decoration and therefore do not show the variety of ways in which the images are adapted to fit the fields they decorate. It is therefore necessary to return the images to their context and consider the compositional limitations of small scale glyptic.

Compositional factors

The decoration of seals is described as low relief. In the division of art into two and three dimensions it falls between the two, exhibiting traits from both and conforming completely to

neither (Alpers 1992:339). Understanding the image is further complicated by the question of whether it was designed to be seen on the seal (intaglio), the sealing (relief) or both (Younger 1995:335).

The field of decoration is always defined by the size and shape of the stone and in some cases additional carved delineation (Younger 1995:340). Schapiro (1969:224) discusses the establishment of boundaries and describes how once these are set there is a need to define the space within. The addition of a ground line defines both the horizontal and vertical axes and also serves to unify the constituent elements. Of the nineteen representations from Cretan glyptic [Nos. 6-24], a base line is included only in No. 22. In the remaining eighteen images however a ground line is implied rather than represented. When the horizontal axis is implied rather than stated it is possible to represent the individual components of the image on different levels as is seen in Nos. 6-21, 23 and 24, where the calf stands on a lower level than the cow. In Nos. 6-10, 12-16, 18-20, 23 and 24 the circumference of the circular lentoid defines the field and serves as a base on which both the cow and calf stand. The curvature of the circumference thus provides a larger area for the description of the calf than if the cow and calf were standing on the same horizontal baseline. Even in the two pillow-shaped seals, Nos. 11 and 17, where the curvature of the lower edge is less pronounced, the calves are still represented on a lower level.

Our tendency is to read objects represented on different levels as being at different distances; the lower the level the nearer the object. That this convention was used by Bronze Age painters is evident in the miniature frescoes from Knossos (Evans 1930:46ff, 66ff, figs 28-34, 36, pls. XVI-XVIII) and Thera (Morgan 1988:70-71). In the case of the image of the cow and calf however the obvious interaction between the mother and young is a clear indication that there is little if any distance between the two animals. The images should therefore be read as the calf standing next to or below the cow. Indeed the *parallel-inverse position* (le Neindre 1982:26) adopted by the calf in nature enables it to stand with its side and back legs against the mother (Hermann & Stenum 1982:17). Physical contact is important for both the mother and calf and this stance enables the cow to continue licking and grooming while the calf is suckling (Hermann & Stenum 1982:20; Stephens 1982:49).

The presence of baselines in Nos. 1, 4, 5, and 22 reduces the space available to describe the calf which is therefore represented in a crouching position, with shoulders pressed down and neck stretched up. This is also the case in No. 21, an oval lentoid. Here as in the circular

lentoids the circumference serves as a base line for both animals. As however the curve of the oval is shallow compared to that of the circular lentoid this reduces the field available for the representation of the calf. The young is therefore shown in a pose similar to that of calves represented standing on the same base lines as their mothers. In No. 2 the cow is set slightly higher than the base line. This allows enough room for the inclusion of the standing calf. In the case of No. 3, the animals and figures are represented on different levels and in all cases the young are represented below and at an angle to their mothers, possibly intentionally indicating an upward and inward directional movement on the part of the young. In Nos. 6, 13, 18 and 19, which conform to PT B, the size of the area in which the calf is represented is reduced by the cow's raised leg. In all these examples the calves are therefore represented in the distinctive crouching pose. This pose in fact reflects the stance of the calf in nature. The pressed down shoulders and stretched neck enables it to reach all the teats and straightens the oesophagus to allow the milk to enter directly into the fourth stomach (Mitchell 1976:6).

Nos. 6, 13, 18 and 19 in which the calf is represented reaching up between the back legs of the cow possibly represents the calf suckling from behind, as they sometimes do in nature (Fraser 1974:150; Fraser & Broom 1997:232). The limitations of a lentoid shape would make it difficult to represent the calf standing behind the cow. On circular lentoids animals are usually represented overlapping vertically rather than horizontally and apart from processional compositions where the animals are represented around the circumference of the stone, animals are rarely represented in a horizontal row. It is therefore possible that these four images represent calves suckling from behind the image being adapted to fit into the decorative field.

If a represented or implied rectilinear framework is not indicated on a circular seal, the perimeter of the face defines the shape in which the axis is radial and the image rotates around the centre (Schapiro 1969:227). The inherent dynamism, torsion or syntactical movement of this type of composition generates a sense of mobility (Betancourt 1985:100-102; Walberg 1986:100-101, fig. 115; Immerwahr 1990:40-50; Hood 1994:233-235). The subjects habitually represented in this way can be divided into those primarily expressing syntactical movement, such as organic whirling motifs (*CMS* II 134 [fig. 3.10]) and those that represent actual movement, such as running or processional animals (*CMS* II 248 [fig. 3.11]). Both types of image indicate that the ancient craftsmen both recognised and utilised the inherent qualities of this type of composition.

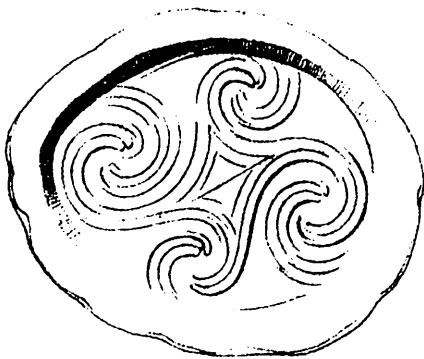


Fig. 3.10



Fig. 3.11

Compositions cannot always be defined as having either a horizontal and vertical axis or a radial axis and in the case of the image of the cow and calf, a represented or implied rectilinear framework is combined with a gentle inwardly spiraling movement. The implied rather than stated nature of this spiral and the oval rather than circular path it takes serve to slow down the inward progression of the eye. In distinguishing between the dynamism and rapid movement of images like figs. 3.10 and 3.11 and the more subtle movement evident in the cow and calf image, Walberg is right to emphasize that the subtlety of the image adds to the intimacy of the scene (1986:101).

Walberg (1986:102-5) describes the turning in of the mother's head as a compositional device to create *coherence* and a sense of closeness and adds that a factor in doing this may also have been ...*the difficulty of representing a head other than in profile* and the greater ease with which an animal with inward turned head can be fitted into a circular field. It is however also important to remember that this is an accurate description of the behaviour of a mother animal who will turn her head in such a way to lick and groom her young while they suckle. The inward-looking, self-contained quality of these images is derived therefore as much from accurate representation of behavioural traits as compositional restraints and devices. This type of self-contained movement and introverted quality has long been recognised as a recurring feature in Minoan art (Groenewegen-Frankfort 1951:199) and a predisposition to represent this type of image was possibly a contributing factor in the selection of the moment of suckling as that represented with far greater frequency than any other type of image of animals with young.

The Frequency and Types of Filling Motifs

Horizontal lines usually serve as base lines and yet in No. 6 two horizontal lines are represented above the back of the cow. This is comparable to CMCG 258 [fig. 3.12], a representation of a standing bovine with three lines above its back, the middle one notched.

Both these examples may be connected with or derived from images of cattle with branches and trees above their backs (*CMS* II3 214, IX 118; *CMCG* 227 [fig. 3.13]). It is also possible that the lines represent spears, more commonly indicated sticking into the back of the animal or as projectiles, approaching at an angle. The difficulty in distinguishing between linear signs, branches or foliage and spears in glyptic art is discussed by Gill (1966:13).²⁷

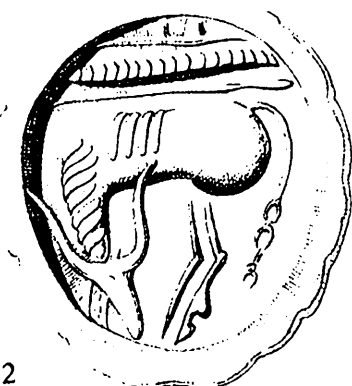


Fig. 3.12

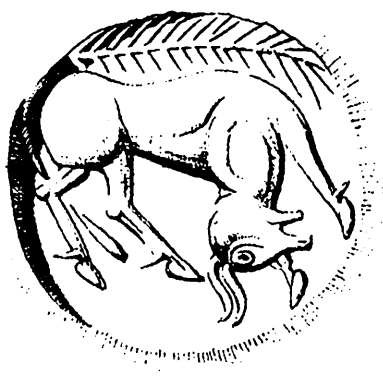


Fig. 3.13

Two birds are represented above the back of the cow on No. 7, one to either side of what is described as a male human face or mask (*CMS*; Younger 1988:71). This example is comparable to *CMS* II3 115 [fig. 3.14] in which a face is represented between two goats and *HMs* 136 [fig. 3.15] (Evans 1935: fig. 613) where a face is represented above the back of a couchant animal (see also Younger 1988:239-40).



Fig. 3.14



Fig. 3.15

CMS X 145 [fig. 3.16] includes what is described as a human face or mask between the neck and legs of a contorted minotaur.

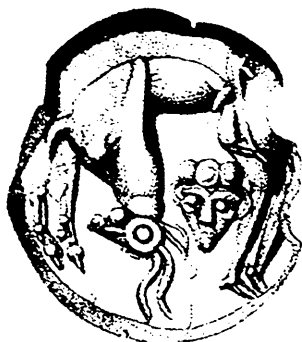


Fig. 3.16

Kenna however describes a similar image, *CS* 334, as a representation of a lion attacking a

bull. There are in fact numerous examples of lions attacking animals ranging from images where the full lion is represented to the partial representation of the animal rising from behind the victim where only the head and mane are visible (CS 334; CMS V 511). No. 7 may represent, symbolise or stem from these types of images. Animals with young are particularly vulnerable and there are two other examples from outside Crete of cows and calves being attacked by lions [Nos. 38, 45], as well as examples of a lion attacking a goat [No. 65] and deer [No. 79] with young. If the image is symbolic of attack or power over the vulnerable it is possible that the face either specifically represents a human face, mask or lion's head or it might be intentionally ambiguous (see chapter 5 for further analysis of this image).

Decoration on other Faces

All the examples, except No.18, are decorated on only one face. No. 18 is a double sided lentoid with what is described as a boar's head on the obverse (Kenna CS:124). Kenna concluded that the boar's head can be dated stylistically to MM III while the cow and calf image was added to the reverse during LM I. Younger (1993:243) describes the image on the obverse as a bull's face and dates it to the same period as the image of the cow and calf. The shape of the animal face is reminiscent of a young bovine or calf and will therefore be considered in greater detail in the context of the representation of calves (see chapter 4).

Distinguishing Cows and Calves from other Animals Represented with Young

Cows, nanny goats, lionesses, does, bitches, ewes and sows are represented with young in Bronze Age art. Distinguishing between the cow and calf and other species with young is not always straightforward.

In nature, monotocous species are distinguishable from polytocous not only by the number of young but also the suckling position.²⁸ Monotocous animals including cows, nanny goats, does and ewes usually stand to suckle while polytocous species including the lioness, bitch and sow lie down (Fraser & Broom 1997:225).²⁹ In Cretan art, however, this distinction is rarely made. In only five of the ninety-one images are animals represented with more than one young [nanny goat: Nos. 61 and 62³⁰; bitch: 82 and 83; sow: 85] and all animals are portrayed suckling in a standing *parallel-inverse position*, the stance associated in nature with monotocous species only.

In nature there is also a clear distinction between species with udders (cows, nanny goats, does and ewes) and those with nipples (sows, bitches and lionesses). Udders are composed

of two to four mammary glands grouped together and are located between the back two legs of the animal. The visibility of the udders may therefore be restricted when the animal is seen in profile. Bronze Age cattle would also have had smaller and therefore less prominent udders than the highly bred milk cows we are familiar with today (Amoroso & Jewell 1963:134). This is reflected in glyptic where udders are rarely represented. Udders are occasionally brought into view by the pulling action of the suckling young [Nos. 1, 4, 5, 21 and 61] and human handlers during milking (*CMS* VS.1A 137 [No. 172]). In No. 19 the raised leg of the mother reveals the udder. *CMS* II5 267 [fig.3.17], a fragmentary sealing, is the only representation of a solitary standing quadruped where udders are clearly indicated by small marks to either side of the back leg. In *CMS* II7 53 two small marks are represented between the back two legs of a bovine. Although these may represent udders it is also possible that they represent testicles.

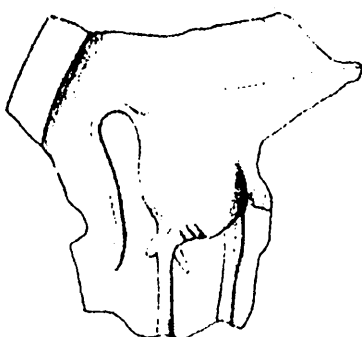


Fig. 3.17

In contrast, the majority of representations of bitches, lionesses and sows suckling their young include an indication of nipples.³¹ These are represented along the underside of the body. The number of nipples indicated varies and rarely reflects the actual number of the particular species.³² Nos. 78 and 82, where nipples are not indicated, are exceptions to this rule.³³

As discussed above, the nature of the medium and size of the field limits the amount of detail that it is possible to represent in glyptic. In the case of No. 85, although the sow is represented with only four nipples they cover the length of her abdomen, giving the impression of an underside covered with nipples as clearly as if all seven pairs were indicated. The suckling calf similarly indicates the presence of the udders, even when they are not represented (Pötscher 1990:78). The limited space between the animal's front and back legs makes the inclusion of two suckling young difficult and of the five examples of animals with more than one young, only Nos. 82 and 85 show both young suckling. In Nos. 62 and 83 the second young are represented above the mother while in the case of the faience plaque [No. 61] the second kid is represented to the side of the goat.

The distinction between animals with udders and those with multiple nipples is an important factor in distinguishing between the types of animals represented suckling. It is however more difficult to distinguish between the different animals within these two groups. Of particular relevance to this current study is the similarity between the cow and calf and the nanny goat and kid, the second most common animal represented suckling its young.

As well as differences in the shape of the bodies and in particular the heads, there are specific differences in horn shape and tail length. When the image is worn or damaged, however, the distinction may be unclear. No. 13 is, for example, included as a representation of a cow and calf but has been described elsewhere (*CMS* VS 1A 156; Younger 1988:71) as a nanny and kid, distinguished by the shape of the horns of the adult and the short tails of both the adult and young. Younger (1988:xviii) describes goats as having ...*horns that curl back from the top of the head and under the cheek* (cf. *CMS* II3 54; VS 1A 155). In No. 13, however, the horns do not conform to this type and appear to rise vertically from the head in a way comparable to those of the cows represented in Nos. 9-12 and 14. Younger (1988:xviii) describes some bovines as having ...*short, thick and striated horns*. The impression is not sufficiently detailed to detect whether the horns are striated but they are certainly short and thick. The tails of both the cow and calf appear short, a feature associated with the depiction of goats.³⁴ Calves are however often represented with proportionately shorter tails than adult cattle [Nos. 6, 9, 10, 20 and 23]. The appearance of a short tail on the mother animal is due to damage around the edge of the sealing and in fact, a thick line, representing the lower section of the only partially extant long tail, curves in from the edge of the sealing towards the calf's head.

Gill (*KSPI*:69, 80 & 94) noted the similarity between *KSPI* K6 and *KSPI* R46 [fig. 3.18]. Both sealings were sketched by Evans (*KSPI*: pl.10 K6, pl. 15 R46) as representing solitary seated bovines. Younger (1993:fig. 66 [fig. 3.19]) described these two examples as impressions of the same seal, representing a cow and calf. Younger's drawing (1993:fig. 66) of the impression differs from Evans' in that he included a second animal and distinctive features such as stubby, short tails, the shape of the bodies and heads and the absence of horns.



Fig. 3.18

The additional details in Younger's drawing are on the whole indicative of a nanny and kid although the large ears, no horns and short tail of the young bear a striking resemblance to Younger's description of a young agrimi (1988:xviii). As a result of consideration of both sets of illustrations the sealings have been included in the current study as a representation of a nanny and kid [No. 68].



Fig. 3.19

Although the representation of all animals as suckling in a standing position is not an accurate description of the behaviour of polytocous species it presents the image in such a way that it is possible to see both the mother and young clearly and determine the nature of the interaction. The pose is however very similar to others which describe very different interactions between animals. The potential for confusion becomes evident when we consider the strong similarity between Younger's (1988:1-3 (see Appendix B) PT 16A described as *Mother Animal Stands in PT 1 Offspring Below and Facing to Suckle* (Younger 1988:68) and PT 43 described as *Attacker Bel[ow] the Victim, Both in Opposite Directions* (Younger 1988:107). The omission of the tail and the different pose of the smaller animal in PT 43 seems somewhat arbitrary. In the examples listed under both pose types the positions of the smaller animals are equally varied and all the examples listed under PT 43 have tails. In the case of No. 8 Younger (1988:71) categorised the image by subject rather than pose listing it under PT 18B, *Mother Animal in PT 13A Offspring Below Facing to Suckle* (Younger 1988:70) whereas in fact the relationship between the two animals would be better described as a subset of PT 42A described as *Attacker Bel[ow] the Victim, Both in One Direction* (Younger 1988:106).

No. 82 is described as representing either bull leaping or a hunt, in which a figure is assisted by two dogs (Kenna CS:119), comparable to CMS II3 9 [fig.3.20] where a man restraining a bull is accompanied by a dog.



Fig. 3.20

Cattle are however most frequently represented being attacked by lions (*CMS* II3 60 [fig.3.7], 173, IV 259, VS IA 140, VIII 121, XII 243, 251) and in one case, by a griffin (*CMS* II3 334).

These images convey a strong sense of movement and action; the pouncing lion, the fleeing bovine and descriptive details including the clawing and biting of the predator and the thrown-back head of the bovine. In contrast however the would-be victim in No. 82 appears to stand still, as do the two predators who stretch up their heads to the underside of the larger animal but do not appear to be biting. It therefore seems probable that this is a representation of an animal suckling two young. The positioning of the young would suggest an animal with teats rather than udders and the build of the animal is indicative of a bitch. The difficulty in distinguishing between an attack and suckling is also evident in No. 86 which has been described as either a dog attacking an animal or an animal suckling its young. This example is comparable to No. 83, a tethered bitch suckling a pup and has therefore been included in the current survey as a quadruped with young.

CMS X 130 [fig.3.21] has however not been included. Despite the similarity of the pose to that of a goat or deer with young, the smaller animal appears to be biting rather than suckling and it is therefore probably a representation of an attack. *CMS* V 726 [fig. 3.22], described in the *CMS* as a horned quadruped possibly suckling its young has been described by Younger (1988:107) as an agrimi attacked by a dog.



Fig. 3.21



Fig. 3.22

There are however insufficient details to determine with certainty what type(s) of animals are represented and the nature of their relationship. Both animals appear to have their legs extended in a flying gallop and the image is therefore unlikely to represent suckling.

Identification of the cow and calf motif also depends upon certain identification of both the adult and young. If either of the elements is unclear, the image cannot be considered in a discussion of the motif as a whole. An element represented in the field below an adult bovine may not necessarily be a calf. Standing bovines are represented with a wide range of objects, animals and shapes in the area between their front and back legs. These include single and multiple combinations of a wide range of motifs: figure of eight shields (*CMS* II3 212 [fig. 3.23], 337, X 258, XI 54, XII 238, XIII 32), twig motifs (*CMS* II3 335 [fig. 3.24], V 248, 254, VS IB 232, X 186, XI 190)³⁵, a figure of eight shield and sacred knot (*CMS* XIII 33), three dolphins (*CMS* XI 226) and unidentifiable motifs (*CMS* II1 284, II3 101, 226, 238, II5 265, 266, V 247, 280, VS IA 71, VII 100, VIII 141, XIII 131). One cannot therefore assume that an unclear element represented beneath a bovine is a calf.



Fig. 3.23

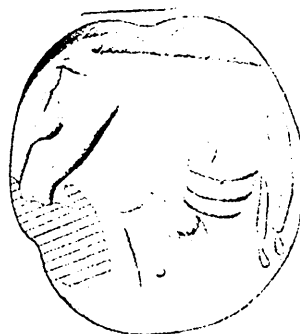


Fig. 3.24

Younger (1988:71) suggests that *CMS* II4 142 [fig. 3.25] possibly represents a cow and calf. The lines between the bovine's front and back legs are however unclear and may represent a branch or plant. *CMS* II4 84 [fig. 3.26] is similar in that the animal appears to turn its head down and around (like a cow to a calf) and there is something indicated between the front and back legs which may indeed be a calf. The face of the sealstone is however too worn to determine what is represented. This is also the case in *CMS* IV 323 [fig. 3.27]. *CMS* IV 272 [fig. 3.28] is described as possibly representing a cow, calf and branch motif while Younger (1988:71) suggests that the marks may represent a calf. Something is represented in this area but the image is too worn for it to be possible to distinguish whether one or two objects are represented and what they are.



Fig. 3.25



Fig. 3.26



Fig. 3.27



Fig. 3.28

Younger (1988:72) describes *HM* 2250 [fig. 3.29] (Sakellarakis & Sakellarakis 1997:fig. 805a,b) as representing a cow and calf while Sakellarakis and Sakellarakis (1997:700) describe it as a bovine and triton shell. Although the latter is not completely convincing, it is the more plausible of the two explanations. *CMS* II 7 80 [fig. 3.30] (sealing), described as a quadruped has elsewhere been described as a goat (Hogarth 1902:88) and a cow and calf (Younger 1988:69). The impression is however too light and worn for it to be possible to determine with certainty whether anything other than a regardant quadruped is represented.



Fig. 3.29



Fig. 3.30



Fig. 3.31

CMS II7 52 [fig. 3.31] described by Levi (*KZ*:170) as a bull has since been described by Younger (1979a:267) as a cow and calf, ...*calf not preserved*. The *CMS* photograph and text draw attention to the light impression of a leg in front of the back leg. This leg however is facing forward and seems too close to the cow's leg to allow for the rest of a calf's body to be represented in the space between the legs. It is possible that this represents a variation of PT H (see Appendix B) in which the calf is represented to the side of the cow. The proportions of the limb are however the same as those of the cow, rather than smaller, as would be the case if this were a representation of a calf. It seems more likely that this is either a representation of two bovines of the same size standing side by side (Appendix B: Younger's PT 19 A-D) or an indication that the seal moved slightly in relation to the clay while the impression was being made.

Problems also arise in determining exactly what is represented in the earliest images of interaction between quadrupeds. Often these images do not include the anatomical details and clear descriptions of the relationship, which enable us to identify what is represented. No. 88, a MM II three-sided prism, is described in the *CMS* as a representation of ...*a stylized goat perhaps with young*. This animal is however very unlike the goat with distinctively backward curved horns and a short stumpy tail represented on one of the other two decorated faces. In contrast, it has a long thin tail and straight horns. Although the details are insufficient to determine with certainty what species is represented, the distinctive, static suckling pose is clear.

The problems of identification are further compounded by forgeries. Although *CMS* II3 389 [fig. 3.32] is described as representing either a cow and calf or a nanny and kid it will not be included in the current study.

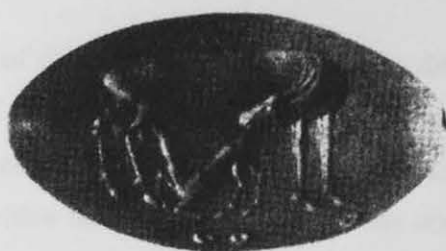


Fig. 3.32

Both animals have long tails typical of cattle. The shape and length of the bodies and horns are however reminiscent of a nanny and kid. The motif is very unusual in terms of both the general representation of the animals and specific features such as the shape of the adult's eye (represented in profile rather than frontally) and the distribution of small circles along the lower edge of the field. In the *CMS* the seal is described as *Vermutlich modern* and Betts (1981:28) included it in a list of seals he believed to be made by a forger working at the beginning of this century. He cites the cloven hooves and leg joints as being stylistically typical and adds that *The piece is virtually 'signed' by our forger with the inclusion of his tentatively drilled circle fillers below the motif* (Betts 1981:28).

Conclusion

In discussing exactly what is represented it becomes evident that the image of the cow and calf is a specific account of the interaction between the mother and young during suckling. The inclusion of details such as open mouths (indicating vocalisation) and raised tails (suggesting defecation) indicate that the images arise from firsthand knowledge of the animals concerned. The consistency of the image and in particular the frequency with which these details are represented would further suggest that the knowledge and inclusion of such details was the norm rather than being indicative of a particularly observant individual craftsman.

The motif, in terms of both subject and composition, is a self-sufficient image and in the few examples where additional elements are included in the field they are not combined but juxtaposed. In such cases, the presence of additional elements may convey a different or distinct meaning from when the cow and calf are represented in isolation. The possible meaning of these images will therefore be discussed in addition to the image of the cow and

calf (chapter 5).

Despite the level of detail, the images may still be difficult to identify. Of the ninety-one representations of animals with young, six have therefore been categorised as quadrupeds with young. In such cases it is possible that intrinsic factors such as the shape or colour of the stone or details within the image or images on the other faces of those with decoration on more than one side served to identify the type of animal and scene represented. It is also possible that external factors such as the user or wearer or time and place of use served to distinguish what type of animal and scene was represented. We must also bear in mind, however, that the importance of the images lay not in the identification of both specific species and actions. The image may have served as an image of nourishment or hunting without specific reference to certain animals being considered important. The intention may indeed have been to represent a category of animals, such as quadrupeds or domesticates.

¹ See also Groenewegen-Frankfort (1951:197)

² Clottes (1989:26) discusses the possibility of intentional ambiguity in Palaeolithic art.

³ Morgan (1997:32) makes the same distinction between natural and symbolic gestures in the representation of humans.

⁴ A paragraph summary of a paper entitled 'The cow and calf' given at the 55th General Meeting of the Archaeological Institute of America (Buchanan 1954).

⁵ Regardant: *head looking back over shoulder, 180° turned from the direction the body is facing* (Crowley 1989a:10).

⁶ According to Poursat all Creto-Mycenaean mirror handles are octagonal or cylindrical (1977b:19).

⁷ Cf. palms and palmettes represented in other mediums (Crowley 1989a:71-75, figs 175-177).

⁸ The 'Potnia Theron' or 'Mistress of the Animals' as the name suggests, exerted authority over animals and probably played a protective role. In later Greek tradition she is associated with the goddess Artemis. See *The Oxford Classical Dictionary* 1996 (3rd edition), 'Artemis'.

⁹ In the introduction to *CMS VIII*, No. 93 is listed as LH III A while in the main catalogue it is listed as LM III B. Both the preface to *CMS VIII* (pp. XI-XII) and Younger (1979:267) emphasise the predominance of Cretan seal stones in the Dawkins collection which, along with stylistic features has led to its inclusion in the current discussion.

¹⁰ Although not dated in the *CMS* the shape, material and workmanship are all indicative of a LM date.

¹¹ Nos. 39 – 41 were recovered from either later or Near Eastern contexts but are included as they clearly originated in the Bronze Age Aegean.

¹² See also the *CMS* descriptions of Nos. 7, 9, and 10 and the *CMCG* description of No. 23.

¹³ The definition of 'naturalism' provided by the *Shorter Oxford English Dictionary* (3rd edition).

¹⁴ Welté (1989:230-232) describes how knowledge of animal behavioural traits is being used in the study of French Palaeolithic art in order to determine the nature of the represented confrontations.

¹⁵ Tambiah (1969:436) records how the account of the founding of the village of Baan Phraan Muan, Thailand is linked to the search made by a cow for a secluded place to give birth.

¹⁶ Houpt (1991:180) states that in locations such as open pasture where it is not possible to hide, the cow with calf stays within the herd to cut down the risk of predation.

¹⁷ Goff makes a similar observation about the way cattle are represented in Mesopotamian cylinder seals during the Uruk period (1963:63-4, fig. 261).

¹⁸ A goat (No. 65) and deer (No. 79) with young are also represented being attacked by a lion.

¹⁹ Bull leaping, grappling and restraining are included in the category of confrontation.

²⁰ See also the tethered bull on a gold finger ring, possibly of Theban origin (*CMS V* 198).

²¹ See the Vaphio Cups (Davis 1977) and the Taureador panels, Knossos (Evans 1930:209ff).

²² See the Antelopes Fresco, Room B 1, Akrotiri (Marinatos 1984:106-112, figs 73 & 78) and the Spring Fresco, Room delta 2 (Marinatos 1984:93-94, figs. 62& 63; Harte 1997:28).

²³ Examples include the four singers on the Harvester Vase, from Ayia Triada, (*HM* 184; Hood 1994:145-6; Higgins 1981:155) and the girl who appears to have wounded her foot, Xeste 3, Akrotiri (Doumas 1985:30). Vocalisation is not only a human response to a specific situation but also an important element of communication. This is illustrated by the figure on the Harvester Vase towards the back of the procession, who turns to speak to a figure behind (Hood 1994:145-6; Higgins 1981:155) and the groups of figures Xeste 3, Akrotiri (Marinatos 1984:73-84, figs. 52, 55 & 56). In discussing the animation in the faces of the large scale figures of the Thera wall paintings, Morgan notes that most of the younger figures have parted lips, ...*an indication of liveliness and anticipation of speech* (1997:35). It is however the viewer of the silent image that feels anticipation; the figures are represented speaking.

²⁴ Although actual defecation is not represented in Minoan art Houlihan (1996:15, fig. 11) records a drawing dating from Ramesside Egypt which represents two fighting bulls defecating and in both cases their tails are clearly raised. See also a wall painting fragment from Deir el Bahri, 2033-1710 BC of a calf with tail raised, defecating (Louvre E14301).

²⁵ Younger's animal suckling pose types are 16 A and B, 17 A, B. and C and 18 A and B (1988; see Appendix B). Here they are divided into A1, A2, B, C, D, E, F, G and H.

²⁶ Only the lower part of the bodies and legs are represented in No. 16. However, from the representation of the hooves, specifically the dashes that appear between the two drill holes indicating the dewclaw, it is possible to ascertain that the calf is facing in the opposite direction to the mother and thus conforms to PT A1 or A2. As the calf stands on a lower level we can assume that it is represented beneath the mother. It is unlikely that the cow's front rear leg is raised above the calf, the space between the calf and the underside of the cow being insufficient, especially as the front legs of the calf are represented straight.

²⁷ Bloedow (1996:33) suggests that the two vertical lines represented in front of the lion on *CMS* II3 122 are spears.

²⁸ Monotocous: *Bearing only one or normally only one at birth*. Polytocous: *Producing several young at birth* (Oxford English Dictionary, 2nd Edition).

²⁹ An exceptions is the sow which occasionally suckles while standing (Fraser & Broom 1997:225).

³⁰ In the case of No. 62 Younger (1988:70) describes the second kid as being on the back of the nanny. The positioning of the young in the field of the image is more likely indicative of the kid sitting near the mother rather than sitting on her back.

³¹ Nipples are also represented in examples where the young are not represented (discussed below).

³² In glyptic sows are represented with between 3-4 nipples. Even if each nipple represented is indicative of a pair (ie. 6-8 teats) this falls well short of the 14 teats that sows actually have (Dyce *et al.* 1987:367-9). Bitches too are represented with between 3-4 (or 6-8) while they actually have ten (Dyce *et al.* 1987:367-9). Lionesses are depicted with between 1-5 (2-10) but have four (Ballintijn 1995:26).

³³ In glyptic the mane is used to distinguish both the male and female lion. The addition of teats to a maned animal therefore serves to indicate a lactating lioness (Ballintijn 1995:26; see *CMS* XI 322). Ballintijn (1995:26) however categorises six images as representations of lions without nipples suckling cubs (*CMS* II3 344; II4 48, 198 (wrongly listed by Ballintijn (1995:26) as II3 198); XII 286; Betts (*BSA* 62) 43 no. 57; *CS* 298). *CMS* II3 344, II4 198 and *CS* 298 are worn but it is still possible to identify nipples. In II4 198 the identification of the motif between the animal's head and back legs as a cub is not certain (Pini *CMS* II4:LXIX) as is also the case in II4 48. Betts (*BSA* 62:43) no. 59 is fragmentary and the rear part of the animal is missing. The published drawing is summary and in the initial description Betts suggests that it may represent a young animal reaching up or a small animal being attacked by the lion.

³⁴ Younger (1988:xviii) also lists the short tail as one of the distinguishing features of young agrimia.

³⁵ See also Sakellarakis & Sakellarakis (1997:735-738, figs. 861, 862) an ivory plaque showing a goat with head turned down and around to a small bush.

Chapter 4: Calves and Young Cattle

Calves and young cattle, in addition to being depicted with cows, are also represented singly or in peer groups. Although the focus of this thesis is the representation and possible meaning of the image of the cow and calf it is important to consider the range of evidence relating to the representation of calves and young cattle. Not only do they stand, in their own right, as an interesting group of images, but the represented subjects and potential meanings may relate to and therefore prove useful in determining the meaning of the cow and calf images. Seventy-six representations of calves and young cattle have been identified in Bronze Age glyptic (see Appendix A).

Terminology

In the field of study relating to the representation of animals in Bronze Age glyptic there is a distinct lack of standardised terminology. This becomes evident when we consider the range of terminology used to describe cattle of different ages (see Appendix C). For example, in the *CMS*, Platon and Pini use the word *Kalb* only in the context of the suckling motif; at other times adding the word *junger* to distinguish the young from the adult bovines while Younger (1988) makes a clear distinction between the bull, cow and calf, using the word *calf* to denote what are described by Platon and Pini in the *CMS* as *junge Stiere* [No. 99] and *Stier...Jungtier* [Nos. 103 & 104] and by Kenna in the *CMS* [No. 134] as *Young... bull*. Younger (1988) further describes No. 144 as a *bull* while Kenna (*CMS*) classes this example as a *Young bull*. Kenna's categorisation divides cattle into three age groups, *bull*, *young bull* and *calf* while Younger distinguishes only two categories, *bull* and *calf* and is therefore, on occasion, forced to resort to the term *calf/bull* [No. 143].

Although the individual authors of the *CMS* volumes are meticulous in their use of standardised terminology, variations across the *CMS* as a whole can be detrimental to its function as a catalogue. For example, in volumes I, I Sup., II3, II4, V, V Sup. 1A and VII the terms *Kuh* and *Kalb* are only used to describe scenes of suckling, all other young cattle being categorised as *Rind(er)* or *Stier(e)*. In *CMS* VIII, IX, X, XII and XIII however, the words *calf*, *Kalb* and *veau* are also used to describe young cattle represented singly or in peer groups.

In recent years there have been calls for the standardisation of *CMS* terminology (Effenterre & Effenterre 1981). This would result in the individual volumes functioning more as part of a whole and as the *CMS* serves as the starting point for many studies of Bronze Age Greek glyptic it would result in a greater degree of terminological standardisation throughout this area of study.

In the current discussion the word *calf* is used to describe young cattle below the age of puberty [Nos. 94-105, 107-112, 114-117].¹ In modern cattle, a bull calf reaches puberty at about ten to eleven months (Russell 1974:213; Fraser and Broom 1990:246) while a female calf usually reaches puberty between six to eighteen months although in some cases as early as four or as late as twenty-four months (Houpt 1991:115). It will be assumed that the calves represented suckling are pre-pubescent while cattle combining the features determined below as typical of calves but also showing features associated with adult cattle will be classified as *young cattle* [Nos. 92, 93, 106, 113].

Seals and Sealings

The following section will concentrate on the twenty-six representations of calves and young cattle on seals and sealings from Crete. Twenty-four of these images are from seals while Nos. 103 and 104 are sealings. There are a further twenty from contexts outside Crete and thirty of unknown origin. These will be referred to for comparison.

The following were recovered from datable Cretan contexts:

	<i>Publication</i>	<i>Date</i>	<i>Provenance</i>
No. 94	<i>CMS</i> II3 13	MM III-LM I	Knossos, Small Palace
95	II3 134	LM IIIB	Nirou Khani, river
96	II3 135	LM IIIB	Nirou Khani, river
98	II4 129	LM	Fortetsa, Grave P (Iron Age grave)
100	II4 153	LM	Ayia Triada, Gr.
102	V 249	LM III BI	Armeni, Gr. 19
103	VS IA 153	MM III-LM I	Khania Kastelli, administrative centre
104	VS IA 154	MM III-LM I	Khania Kastelli, administrative centre
116	Popham <i>et al.</i> 1984:195, misc. seals: 12, pl. 18	LM	Unexplored Mansion (Hellenistic trench), Knossos
117	Sakellarakis & Sakellarakis 1997:699, fig. 805	LM IIIA	Mycenaean Grave Enclosure, Phourni, Arkhanes

No. 98 was found in a Geometric burial context while No. 116 was found in a trench with Hellenistic material. Both have been dated on stylistic grounds to the Minoan period; No. 98 to 1600-1550 BC (Younger 1993:172-3) and No. 116 to the LM period (Younger 1988:81).

The following are from undated Cretan contexts and are assigned to the LM period on stylistic grounds.

	<i>Publication</i>	<i>CMS Dating</i>	<i>Other Dating</i>
No. 92	CMS I sup 79, Crete		
93	I sup 91, Crete		
97	II4 5, Knossos	Nachpalastzeit	LM/LH (Younger:1988)
99	II4 151, Phaistos	LM	LM/LH (Younger:1988)
101	IV 286, Crete	LM III A2	
105	VIII 66, Crete	LM IB	LM/LH (Younger:1988)
106	IX 130, Crete	<i>Néopalatial</i>	
107	XII 137, Crete	MM III	LM/LH (Younger:1988) 1650-1600 (Younger 1993:162)
109	AM 1938.792 (CS 167), Kandia district		
109	AM 1938.970 (CS 206), Mirabello		LM/LH (Younger:1988)
110	AM 1938.1027 (CS 296), Central Crete		
111	AM 1938.969 (CS 301), Knossos District		LM/LH (Younger:1988)
112	AM 1938.1028 (CS 333), Rethymnon		
113	AM AE 690 (CS 334), Dictaian Cave		LM/LH (Younger:1988)
114	AM 1941.92 (CS 383), Crete		LM/LH (Younger:1988)
115	AM 1971.1136, Knossos		LM/LH (Younger:1988)

A further twenty examples of representations of calves in Bronze Age glyptic have been recovered from non-Cretan contexts.

	<i>Publication</i>	<i>Date</i>	<i>Provenance</i>
No. 118	CMS I 58	1500-1200	Mycenae, Ch. T. 25
119	I 72	1500-1200	Mycenae, Ch. T. 33
120	I 122	1500-1200	Mycenae, Ch. T. 86
121	I 189	LH II-III A1	Midea Th. T.
122	I 215	LH IIIB1	Prosymna, Gr. XLI
123	I 238	LH IIA	Vaphio Th. T.
124	I 287	LH IIA	Pylos T. Æ
125	I 375	LH III B2-C1	Pylos, Palace
126	V 316	LH	Delos
127	V 352/353	LH III A-C	Medeon, Gr. 29
128	V 356	LH III A-C	Medeon, Gr. 29
129	V 359	LH III A-C	Medeon, Gr. 29

130	V 360/383	LH III A-C	Medeon, Gr. 29
131	V 393	LH IIIA	Medeon, Gr. 99
132	V 418	LH IIIC	Medeon, Gr. 264
133	V 673	LH IIIB	Thebes, Kadmeion
134	VII 105	LM II	Mycenae ²
135	XIII 12	LM/LH	Böotien
136	Evans 1935: fig. 499		Mycenae
137	Frodin & Persson 1938:373-4, LH IIIC1 fig. 242, 2		Asine

There are a further thirty of unknown origin, some of which have been dated on stylistic grounds.

	Publication	CMS Dating	Other Dating
No. 138	I sup 169		
139	VII 103	LM II	LM/LH (Younger:1988)
140	VII 112	LM II	
141	VII 115	LM II	LM/LH (Younger:1988)
142	VII 176	LH IIIA	LM/LH (Younger:1988)
143	VII 192	LH IIIC	LM/LH (Younger:1988)
144	VII 261	LM IIIA	LM/LH (Younger:1988)
145	VIII 130	LM IIIB	LM/LH (Younger:1988)
146	VIII 140	LM II	
147	IX 111	<i>Néopalatial</i>	LM/LH (Younger:1988)
148	IX 135		LM/LH (Younger:1988)
149	IX 192	<i>Mycenien (Crète et Continent)</i>	
150	X 249	LM/LH	LM/LH (Younger:1988)
151	X 271	LM/LH	LM/LH (Younger:1988)
152	X 294	LM/LH	
153	X 298	LM/LH	LM/LH (Younger:1988)
154	XI 56	LM/LH II-III A1	LM/LH (Younger:1988)
155	XI 186	LM/LH II-III A1	
156	XI 187	LM/LH II-III A1	c. 1450-1425 BC, Mainland (Younger:1985:69, 8a)
157	XI 268	LM/LH II-III A1	
158	XI 283	LM/LH II-III A1	
159	XII 227	LM II	
160	XII 238	LM II	LM/LH (Younger:1988)
161	XII 263	LM IIIA	LM/LH (Younger:1988)
162	XIII 11	LM/LH	LM/LH (Younger:1988)
163	XIII 59	LM/LH	LM/LH (Younger:1988)
164	AM 1938.1094 (CS 336)		LM/LH (Younger:1988)
165	AM 1941.135 (CS 1P)		

166 AM 1971.1152
167 AM 1980.288

MM III-LM I (Acq. Reg.)

The earliest recognisable representations of single and groups of calves and young cattle have been dated to the MM III period and the latest to LM IIB/ LH IIIC. There are earlier representations of quadrupeds that exhibit some of the characteristics of calves but the diagnostic details are too few for there to be certainty as to what types of quadrupeds they represent. Although these will not be discussed in the context of the images of calves and young cattle they will be considered below as they represent the probable origins or earliest stages of this category of image.

The Process of Identification

The depiction of different ages in Bronze Age Greek art is not restricted to images of animals but is also very much evident in the representation of humans. Beyond a simple distinction between adults and children, different stages of human development within these categories are clearly defined (Rühfel 1984: 15-21).³ On the MM III - LM I Chieftain Cup from Ayia Triada [fig 4.1](Hood 1994:143-145, fig. 137) two youths of different ages are represented while a MM II sealing from Knossos shows the heads of a man and youth [No. 173](Evans 1921b:fig 201 a, b). A wall painting from room 3b, Akrotiri, Thera shows men and youths of different ages (Doulas 1992: pls.109-115).

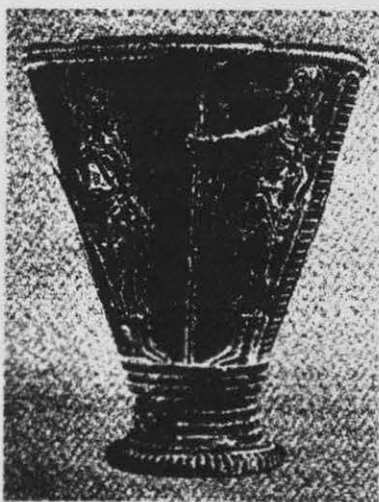


Fig 4.1

In these examples the ages of the individuals are more immediately recognisable than if the figures were represented in isolation. Whereas variations in the way figures are represented can be attributed to variables such as the style, technique or medium used by a particular artist,

variation within a single image shows a clear intention to represent figures defined (both singly and in terms of the interaction) by their difference in age, sex or ethnicity. Other factors such as the way figures interact or variations in costume and hairstyle may also be indicative of age (Davis 1986; Doumas 1992:130). The Chieftain Cup [fig. 4.1], and paintings of men and youths, for example, have been described as representing rights of passage (Hood 1994:143-145; Doumas 1992).

In the study of cattle imagery, similar factors play an important part in determining what is represented. In the images of the cow and calf, the anatomical distinctions between the adult and young are evident and the nature of interaction clearly denotes the ages of the animals. Although the process of determining the age of calves and young cattle singly or in peer groups is more difficult than if they are represented in mixed age groups, it is possible to identify features and elements indicative of particular stages of development. As is the case in the depiction of children in Bronze Age Greek art, young cattle and calves are not represented as miniature adults but possess youthful anatomical characteristics and proportions and exhibit behavioural traits appropriate to their age.

In order to identify features descriptive of different ages of cattle it is valuable to consider the types of evidence used by zooarchaeologists when attempting to determine the age of animals from faunal remains. A range of factors are taken into account including the extent of epiphyseal fusion and cranial suture closure, the growth and condition of teeth, the growth of incremental features such as horns and overall size and form (Chaplin 1971:76; Grigson 1982a:12). Some of these factors, including the extent of bone fusion and the presence and condition of teeth, are not detectable in representations. It is however often possible to identify the overall shape and proportions of the animal as well as the growth of incremental features, including the horns. As the texture and density of the horn core, a factor taken into account by the zooarchaeologist (Armitage 1982:41-6; Grigson 1982b:27), is not evident from the representations, we must focus on the size and shape of the horn.

Recognizing variations in horn size and shape is however problematic. As well as reflecting age difference, variations may also be indicative of:

1. Animals of different sexes
2. Castrated or dehorned animals
3. Wild, domestic or feral animals
4. Different breeds ranging from longhorn to hornless varieties (Grigson 1982a:15;

1982b:25,27; Arbogast *et al.* 1987:24; Amorosi 1989:24).

As discussed in Chapter 2, there is faunal evidence from Crete and the surrounding regions that may be indicative of all the above.⁴ Variations in the shape and size of horns represented may therefore be indicative of these various types rather than necessarily reflecting age difference.

Zooarchaeologists rarely identify exact ages and even when they are able to chart a horn developmental sequence within an assemblage this tends to be interpreted as representing an age range rather than specific ages (Grigson 1982a:15). Within the range it may be possible to distinguish between old and young but within these individual categories the distinction becomes blurred, particularly between adult and old cattle (Klein & Cruz-Urbe 1984:41).

The study of images of calves suckling is important in identifying calves represented singly or in peer groups. The suckling context provides us with certain images of calves between birth and about eleven months old when natural weaning occurs. In sixteen [Nos. 1, 2, 3, 7, 9, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 24] of the twenty-six representations of cows with calves from Minoan contexts the calf's head is sufficiently preserved to detect details. In all the images the distinctive domed head of the calf is described and in eight a short horn or bud is indicated [Nos. 1, 3, 7, 9, 10, 12, 14, 15, 17, 24]. When a calf with short horns or buds is represented being suckled by a long horned cow it is reasonable to assume that it is a very young animal barely formed buds being an indication of a new-born calf (Dyce & Wensing 1971:3). When, however, a similar calf is represented in a context other than suckling it is possible that it is of a shorthorn variety.

There are six examples of hornless suckling calves [Nos. 2, 18, 19, 20, 21, 22]. In five [Nos. 2, 18, 20, 21, 22] of the images the presence of the long-horned cow suggests that the calf is not of a short horn breed. On No. 19 however the head of the mother is not preserved and so this remains a possibility. Otherwise it is possible that these are representations of very young calves or animals that have been poled, the first weeks of life being the optimum time to carry out this procedure.

Dehorning or poling can be done at any stage of an animal's life. The easiest, most successful method is to debud the young calf. This involves destroying the corium, thus preventing the growth of a horn (Dyce & Wensing 1971:3; Frandson & Spurgeon 1992:210). Chemicals or a hot iron can be used to carry out this procedure (Russell 1974:212-3). In

Britain this must be done within the first eight weeks of life and if the calf is over one week old, an anaesthetic must be used (Russell 1974:212). In older cattle where the horn has developed, poling involves the surgical removal of the horn core, keratin and the skin at the base of the horn. If all is not removed a ...*crooked horn stub* may develop (Dyce & Wensing 1971:3; Frandson & Spurgeon 1992:210). As cattle use their horns as a weapon, dehorning serves to ensure that there is less likelihood of them injuring each other in conflicts within the herd as well as reducing the risk to herdsman.

Horn growth is continuous but may be effected by seasonal changes, nourishment, reproduction or stress. A change in the rate of growth is reflected in the visible horn circles around the base. These can be counted to estimate age (Dyce & Wensing 1971:2; Amorosi 1989:23; Frandson & Spurgeon 1992:210). These lines are often included in representations of older cattle in Bronze Age art (cattle: CMS II4 132 [fig 4.2]; VII 116; XII 262; XIII 43, 83, 131; bucrania and cattle heads: CMS II2 190, 211; II3 11 [fig 4.3]; IV 168; VS IA 326; VIII 116; X 68; XIII 1). Conversely, their absence from animals with shorter horns probably indicates youth.



Fig 4.2

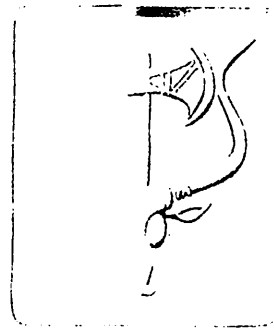


Fig 4.3

In addition to the size and shape of the horns, the size and shape of the body is another important factor in distinguishing representations of calves and young cattle. In terms of general proportions, calves and young cattle have less muscular, longer legs, thinner bodies and larger heads than adult cattle. In a young calf the muscles of the face are not well developed and the domed, narrow features reflect the shape of the skull. As the muscles around the face of the juvenile grow and fill out the contours become flattened and the animal develops a pyramidal shaped face (Dyce & Wensing 1971:1). The bull's head is usually broader than the cow's and wild cattle tend overall to have broader heads than domesticated breeds (Grigson 1982b:26).

There are four representations of the heads of calves and young cattle in Minoan glyptic [Nos. 94, 98, 108 & 109]. No. 108, a three-sided prism, is an example of the use of the image as part of hieroglyphic script. In Nos. 94, 98 and 109 the head is represented in isolation. In all the examples the dome of the head is visible and the face appears bony compared to the fuller form of adult profiles (cf. *CMS* II2 36, 211; IV 168 [fig 4.4]; XII 62).



Fig 4.4

The surface of No. 94 is worn but it is possible to detect a short horn while on No. 108 small dots just behind the domed heads may indicate horn buds. The tip of a newly formed horn is visible above the dome of the head on No. 109.

In the majority of cases, bulls' heads and bucrania are represented frontally rather than in profile. Of these, several may represent calves or young cattle (*CMS* VS IA 40 [fig 4.5], 277 [fig 4.6]; X 53 [fig 4.7]; XII 16 [fig 4.8]). They are however stylised to the extent that they are little more than outlines and the presence of what appear to be short horns may, in addition to the possibilities discussed above, be interpreted as a simplification or stylisation of the subject.

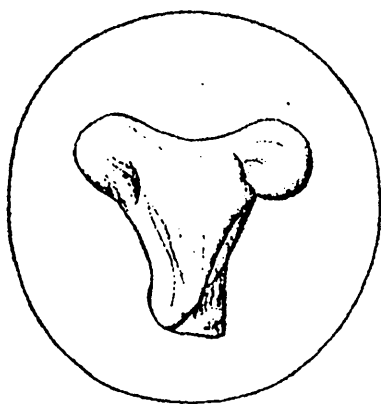


Fig 4.5

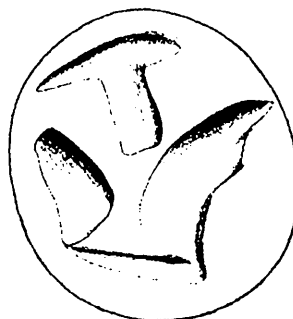


Fig 4.6



Fig 4.7



Fig 4.8

No. 18 is an unusual lentoid in that it is decorated on both sides. On one face is a representation of a cow and calf while on the other is a frontal animal face. Kenna concludes that the two carvings are from different dates, the animal face being the earliest (MM III). Younger however describes the two images as contemporaneous (LM I) (Younger 1988:25).

This face is described by Kenna (CS 243) as a *boar's head* while Younger (1993:243a) describes it as a *bull's face*. It combines the domed narrow head, typical of a calf, with tusks, a long narrow snout and prominent bristles, typical of a pig or boar [cf. No. 83]. A third possibility is that the image represents a composite face. In discussing the fantasy animal mask series from Zakro, Weingarten describes prominent rounded ears, and eyes, bulbous heads, bristles and tusks as characteristic of the group (1983:65-68, 108). Indeed, if we compare the face represented on No. 18 with examples from the Zakro sealings we can see many similarities (eye and ear shapes, bristles and tusks: CMS II7 189 [fig 4.9], 190, 191; head shape, ears and bristles to either side of head: CMS II7 201 [fig. 4.10], 202). It is therefore possible that No. 18 represents a similar composite animal head.



Fig 4.9



Fig 4.10

Nos. 92, 93, 106 and 113 fall into the category of young cattle rather than calves. All have horns larger than the calves represented with cows in images of suckling and their proportions are more akin to those of adults. They are not, however, as bulky as older cattle and their horns do not have the same breadth and length.

Nos. 101 and 150 classified here as calves have been described elsewhere as dogs (see Appendix C). Dogs are represented on seals as early as EM III - MM IA (Yule 1980:129-130). Younger (1988:xvii - xviii) describes dogs as having long tails, pointed ears, deep chests and thin waists and usually wearing collars. Calves are represented with many of these features including deep chests [Nos. 95, 97, 99, 112 & 116], thin waists [Nos. 95, 96, 99, 114 & 116] and pointed ears [Nos. 94, 102, 105, 107, 110 & 115]. If the image is worn, damaged or summary it may be hard to distinguish between hooves and paws and pointed ears and short horns. The extent of the similarity between calves and dogs is illustrated by S. Marinatos⁵ (1971:46) original interpretation of the fragmentary remains of paintings of calves and monkeys, Room B6, Akrotiri as representations of hounds pursuing monkeys (Doumas 1992:111, pl. 91). Nos. 101 and 150 have been included in the current survey as calves because they exhibit the characteristics of calves rather than dogs and in both cases hooves are distinctly represented.

Three-dimensional Representations of Calves and Young Cattle

Although this thesis is concerned primarily with the representation of the cow and calf in two dimensions and low relief, there are several representations of calves or young cattle produced in three dimensions (discussed in chapter 3). The factors governing the production of such objects are distinct from those relating to the production of images in relief. These three-dimensional representations serve however as valuable comparative material to the current study.

CMS III 237 [fig 4.11], an ivory or bone stamp, was discovered in a tholos tomb between the villages of Moroni and Panaghia (Marathokephalo) in an EMII-MMIB context (Yule 1980:99 EM III-MM IA). Although only about a quarter of the stamp is preserved it clearly represents the front legs and head of a calf. The distinctive thin legs are bent and the calf's head is turned to the side. There are two holes in the domed head to indicate the eyes. There are a further three holes below the head. The stamp face is decorated with a leaf and tendril motif.

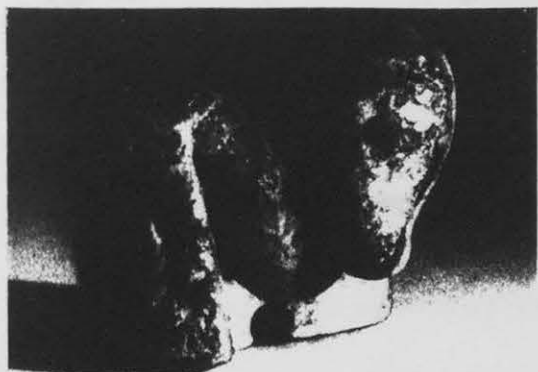


Fig. 4.11

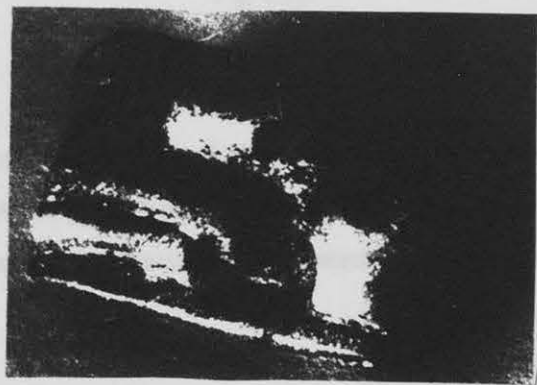


Fig. 4.12

CMS III 253 [4.12] was recovered from Tholos tomb A, Platanos and has been dated to EM II-MMII (Yule 1980:98 EM III-MM IA). It is made of bone or ivory and represents a couchant calf on a trapezium base.⁶ The thin back legs are to one side and run parallel to the body. The head is turned to the same side. The eyes are described by two holes in the domed head and there is a slightly larger hole in the animal's back. A corner of the stamp face is missing but the image is largely undamaged. The face is decorated with two stylised animals, probably lions, moving left. The animals are surrounded by circular filling motifs

Cattle heads are also represented in jewellery (Effinger 1996:48 HT 9b [fig. 4.13]; Sakellarakis & Sakellarakis 1997:688, fig. 785 [fig. 4.15]; *AM* 1941.191; AE 186 [fig. 4.14]) manufactured in gold, stone and ivory. The majority have short horns. This may indicate youth but may also be indicative of the practical problems of producing jewelry where protuberances may prove cumbersome, prone to damage, difficult to carve and in the case of gold, expensive additions. In some examples it is hard to tell whether bulges are intended to represent horns or ears [figs. 4.14 & 4.15]. Sakellarakis and Sakellarakis (1997:688, fig. 785 [4.15]) describe a stamp in the shape of a bull's head as having severed horns, possibly indicative of a poled animal. In the majority of cases the breadth and pyramidal shape of the heads suggest that they are intended to represent adult rather than young cattle although in some examples, such as fig. 4.13, the less muscular facial structure, the proportionately large eyes and ears and the presence of horn buds serve as a clear indication that calves' heads were also represented.



Fig. 4.13



Fig 4.14



Fig 4.15

Behavioural Traits

As the calf grows it tends to spend less time near its mother and more with other calves (le Neindre 1982:26, fig 2; Houpt 1991:228-9). An important part of its life during this period is play. Play is an essential aspect of the learning process, and the gestures and actions

practised and developed in play are those that will be used in fighting, defence, mating and flight by the adult animal (Brownlee 1954:57; Fraser & Broom 1990:248).

As the calf grows, the periods of play become shorter and less frequent and by seven weeks, the calf plays for only about three minutes a day (Haupt 1991:229).⁷ Play serves not only to aid physical development but also, through contact, the calf develops a greater awareness of its surroundings. Calves may play within peer groups or in isolation and calves often begin solitary play within a few hours of birth (Brownlee 1954:54; Fraser & Broom 1990:248, 253-5; Haupt 1991:229). Solitary play is probably the subject of four images of single calves in vigorous motion [Nos. 96, 100, 101 & 105].

Play also facilitates the development of social skills (Fraser & Broom 1990:253-5) and is a very important aspect of group interaction as it is through play that social hierarchy is determined, the larger calves tending to be dominant (Mitchell 1976:9; Stephens 1982:54; Fraser & Broom 1990:253-5). Ten of the twenty-six images of calves and young cattle from Crete are representations of pairs [Nos. 93, 97, 99, 102, 106, 110, 112, 113, 114 & 116] while No. 117 is a representation of a group of three.⁸ All these examples are described as representations of the animals in motion and demonstrate grouping and social interaction among calves.

In his categorisation of pose types, Younger (1988; 1993) makes a distinction between adult cattle depicted running (PTs 5A, 5B and 6; *CMS* I sup. 100 [fig 4.16]; II3 20, 89, 174, 285; IV 268; VS IA 104) and those represented in the flying gallop (PTs 3 & 4; *CMS* VS IA 145 [fig 4.17], 171).



Fig 4.16

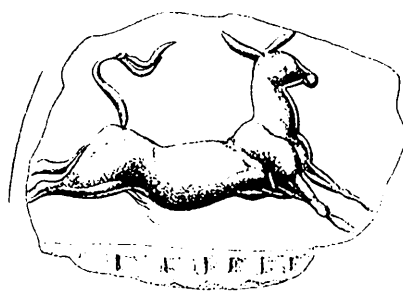


Fig 4.17

When in motion, calves and young cattle are however always categorised as running. Pose types 5A, 5B and 6 are indeed more indicative of the way a calf moves, in particular when

gambolling rather than in the flying gallop. Gambolling can consist of prancing, trotting and galloping, usually with the tail elevated (Brownlee 1954:52; Mitchell 1976:9; Fraser & Broom 1990:250; Houpt 1991:229). In Nos. 100 and 101 the tails are raised while in Nos. 92, 97, 102, 105 and 112 the tails are being shaken to the sides, emphasising the sense of movement. In Nos. 95, 96, 101, 102 and 105 the calves are regardant while in four other examples showing groups of calves the calf to the rear is regardant [Nos. 110, 112, 115 & 117]. This pose may be indicative of the vigorous head-shaking that often accompanies play (Brownlee 1954:53). In Nos. 97, 99, 114 and 116 the details are insufficient to determine whether the calf to the rear is regardant or facing in the opposite direction.

Play also includes mock fighting consisting of butting, pushing, pawing at the ground, bucking or kicking at stationary or moving objects, including other calves (Brownlee 1954:52; Mitchell 1976:9; Fraser & Broom 1990:250; Houpt 1991:229). The majority of images of animals fighting from Bronze Age Greek art are of animals of different species and the emphasis is very much on the predator/victim relationship. Among the wall paintings of Thera there are however two images which have been described as representing confrontation between animals of the same species (Antelopes - Marinatos 1984:106-112 [fig 4.18]; Swallows - Harte 1997:28 [fig 4.19]).

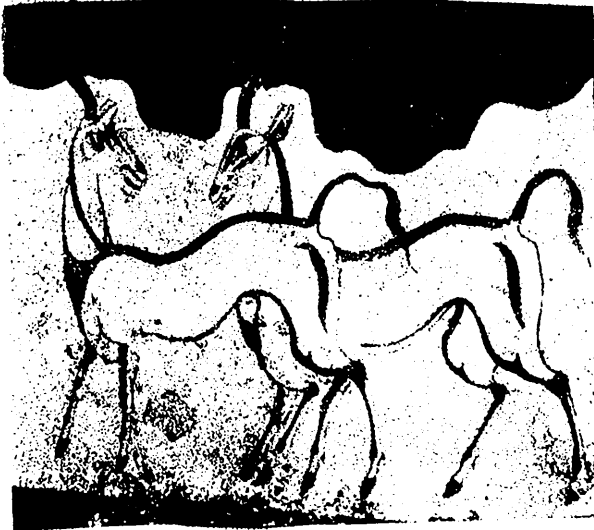


Fig 4.18



Fig 4.19

Confrontation between animals of the same species does not involve the same level of aggression as between predator and victim and broadside displays play an important role (Marinatos 1984:106-108). It is possible that images of pairs of calves and young cattle in glyptic may represent this type of interaction.

Periods of play are often accompanied by a distinctive play call (Brownlee 1954:52; Fraser & Broom 1990:149; Houpt 1991:29). In Nos. 100, 102 and 106, the animals appear not to be threatened and yet are represented open-mouthed. This may be indicative of the play call and, in the case of No. 106, interaction within the peer group.

Calves spend 60-80% of their time lying down. This is considerably more than adult cattle, which spend only about 50% of the day lying down (Houpt 1991:92; Mitchell 1976:7). Although there are representations of couchant calves [Nos. 107 & 115] the proportion is not reflective of the amount of time calves and young cattle spend lying down. No. 107 is unusual in that the legs do not appear to be represented (cf. *CMS* I sup. 92 [fig. 4.24]). The shape of the head and horns do however suggest that this is an image of a calf. The animal is wearing a collar, indicative of human control and is therefore comparable to other images of tethered cattle including *CMS* VS 1A 173, VII 102 [fig 4.20], XII 249 and *KSPI* Q20. These images constitute a small proportion of the representations of cattle from Cretan glyptic, the collar and rope being most commonly associated with the dog (Younger 1988:xviii).



Fig 4.20



Fig 4.21

In No. 115 a seated calf is depicted with fully extended neck and open mouth. Inverted above its back is the representation of a seated lion. The image is comparable in composition to two images of adult cattle and lions (*CMS* XII 243 [fig 4.21]; *CMGC* 291). Rather than describing a moment of confrontation, the representation of these two animals in the same field implies, rather than states, interaction. The open mouth and stretched neck of the calf in No. 115 is indicative of bellowing, a common aspect of the representation of cattle as victims. If the image is symbolic of the relationship between prey and victim, it is comparable to the representations of pairs of calves in that interaction is implied rather than described. It is also possible that it depicts the predator/victim relationship, as implied in

CMS III 253 [fig 4.12] which combines the three-dimensional image of a seated calf with a two-dimensional image of two lions.

Nos. 103, 104 and 111 show calves under attack. In all cases the animal is represented with a projectile sticking in its back, its front legs giving way, its head back and mouth open. All three images show the calves raising their back nearside legs in an attempt to remove the projectile. This is reflective of the instinctive cattle response to pain. When in pain, cattle nip or kick at the area where they are feeling the pain rather than at the source of pain. A cow receiving an injection will therefore kick and bite at the area of the needle rather than the vet. The genitals are represented in all three examples and indicate that these are young bulls or bull calves.

The pose of the calf in No. 100 is very similar to that of the collapsing wounded calves discussed above. The neck is stretched up, the mouth open, and the nearside hind leg raised. There is however no indication of a projectile. This is comparable to *CMS V 252* [fig 4.22], a representation of an adult bull in the same pose but exhibiting no evidence of injury. In both cases the image is probably intended to represent the animal scratching. The frequency of images in which animals are represented scratching is emphasised by the subject being assigned its own pose type (14B) in Younger's system of classification (1988). The potential ambiguity of this type of image is however epitomised by *CMCG 190* [fig 4.23], a representation of a bull scratching its head. A line above the head may represent a projectile but may also have been caused by damage to the seal face.



Fig 4.22



Fig 4.23

No. 114 represents two animals. As the face is worn it is difficult to determine whether a line above the back of the front animal is a projectile or the outline of the neck of the animal to the rear.

Base lines are represented on Nos. 92, 111, 112, 113 and 117. The couchant calf on No. 107 sits on an unusual brick-like base, similar to that of *CMS* I sup 92 [fig 4.24] and VS IA 145 [fig. 4.17]. A different type of setting is implied by the foliage on No. 110 (see Chapter 5). Above the back of No. 95 is an object that may be a representation of foliage or a projectile. The face of the image is damaged in the area of this shape but it is also possible that it represents an impaled triangle (cf. *CMS* II3 338 [fig 4.25] & VIII 107)

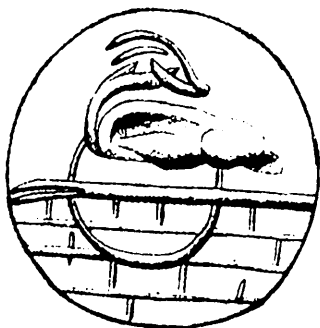


Fig 4.24

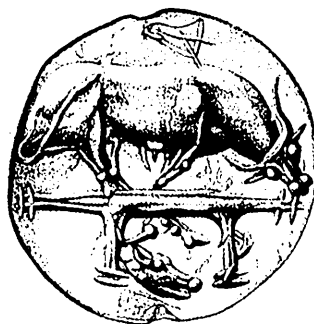


Fig 4.25

The base line of No. 93 is composed of a line with six circles along its length. Branches sprout from each end and rise above the back of the animal on the left. There are several examples of spears with intermittent circles along their length (*CMS* I sup 77 [fig 4.26], II4 200, IV 278, IX 119, XII 235). There are also several representations of plants with circles along the length of the shaft (*CMS* I 105, 375, V 157, VS IA 102[fig 4.27]). Although the straight, horizontal positioning of the line is more akin to that of a spear than the naturally curving shaft of a plant, branches appear to rise from each end. It is possible that the image represents a combination of the two elements, the inclusion of the figure-of-eight shield in the field emphasising the symbolic nature of the image.

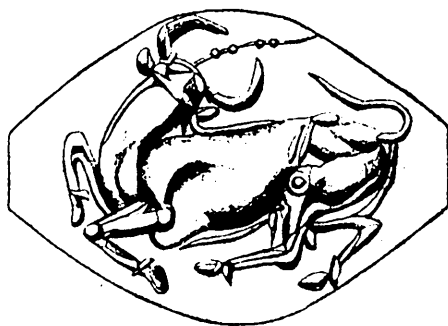


Fig 4.26



Fig 4.27

Figure-of-eight shields are represented in the fields of Nos. 93 and 97 while cup sinkings are represented in the fields of Nos. 106, 109 and 113.

The EM- MM Origins of the Image?

CMS II1 64c [fig 4.28], 278, 287a, 391a,b,c,e,n [fig 4.29] II5 288 [fig 4.30] and CS 51 [fig. 4.31] are possibly representations of calves or young cattle. They all date to EM IA-MM II.⁹ Features including thin legs, bodies and heads, hooves and either a lack of or short horns are indicative of young cattle, sheep, goats and deer but beyond this, the lack of details make it is difficult to distinguish species. All are standing except CS 51 which appears couchant. The front legs of CMS II1 64 are raised, possibly indicative of gambolling or running. The ambiguity and uncertainty surrounding these images is evident from the range of descriptions:

CMS Volume / CS	CMS/ CS description	Other descriptions
II 1: N. Platon (1969)	64c. Vierfüßler (Wildziege?) 278 Vierfüßler (Reh?) 287a Vierfüßler 391a: Gehörnter (?) Vierfüßler (Ziege?) b: Vierfüßler (Pferd?) c: Vierfüßler (Pferd?) e: Vierfüßler (Ziege?) n: Vierfüßler (Wildziege?)	Younger (?) Younger (1993) a: agrimi kid b: agrimi kid c: agrimi kid e: agrimi kid n: agrimi kid
II 5: I Pini (1970)	288 Vierfüßler	
CS: V. E. G. Kenna (1960)	51 calf or cow	

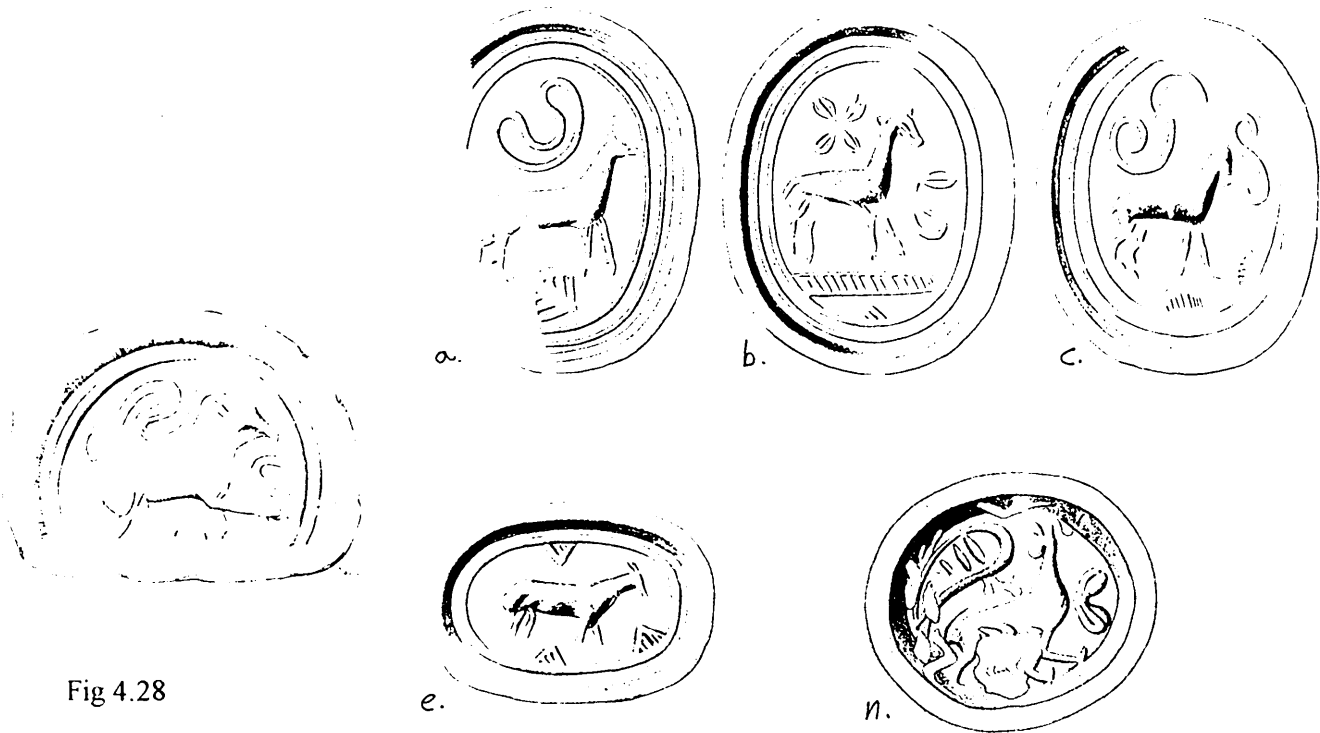


Fig 4.28

Fig 4.29

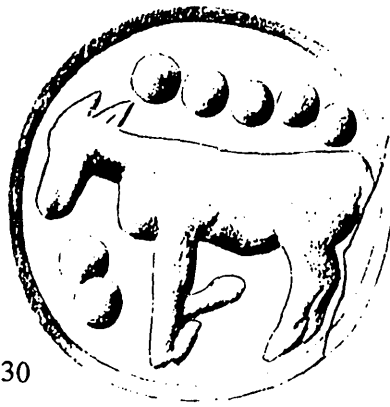


Fig 4.30

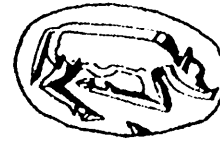


Fig 4.31

It is possible that the images were intentionally ambiguous. Sakellarakis and Sakellarakis (1997:328) state that as the quadrupeds represented on *CMS* II1 391 are almost identical to each other it is unlikely that they were intended to represent specific species. In the case of the *CMS* II1 64, 278, 286 and 391 it should however be taken into account that the seals are made of bone or ivory (Krzyszkowska 1989:118, 123; Sakellarakis & Sakellarakis 1997:327) and as a result the images have suffered as the material has deteriorated. The impression on the clay sealing *CMS* II5 288 is also unclear.

Conclusion

In addition to the mother and young context discussed in chapter 3 calves and young cattle are represented in a diverse range of scenes of interaction and isolation. The images include scenes of interaction within peer groups and with man (implied rather than represented). The quantity and diversity of these images suggests that there is potential for multiple and layered meaning. As is the case in the images of cows and calves, accurate descriptions of behavioural traits and anatomical features are consistently included.

¹ Fraser and Broom (1990:245) list the various definitions of puberty. Here, their definition as *...the period when effective mating can occur...* will be adhered to.

² Although recorded as being Mycenaean, it is described in *CMS* VII:vii as one of a group which *...show at varying stages the finest work of the Late Knossian Palace.*

³ The crawling baby from the Psychro cave c. LM I (Hood 1994:fig. 98; *AM* 1938:1162). Two ivory boys, two to three years old from the destruction level at Palaikastro (Hood 1994:120, fig. 108; Rühfel 1984: 15-21). Two older boys are represented on the Chieftain Cup, Ayia Triada MM III- LM I (Hood 1994:143-145, fig. 137; *HM* 341).

⁴ In addition to the evidence outlined in Chapter 2, faunal remains and representations indicate the presence of distinct breeds in the Near East by the fourth millennium, and hornless cattle were common in Egypt by the third millennium (Buitenhuis 1984:213).

⁵ S. Marinatos will be used to refer to Spyridon Marinatos while Nannó Marinatos will be referred to as Marinatos throughout.

⁶ Described in the *CMS* as made of *Elfenbein* and by Krzyszkowska (1989:122) as made of either bone or ivory.

⁷ Adult cattle occasionally play (Brownlee 1954:54).

⁸ Nos. 122 (Prosymna), 123 (Vaphio) and 140 (unknown origin) show groups of three calves while

No. 135 (Böotien) is a representation of a group of four.

⁹ *CMS* dating: II1 64 Early Old Palace; 278 EM IA – MM II; 287 MM IA – II; 391 EM III – MM IA; II5 288 MM IB-IIA.

Chapter 5: Interpretations of the Images of Cows, Calves and Young Cattle

In the previous chapters the physical characteristics and behavioural traits of young cattle, calves and cows with young were discussed in order to establish exactly what the images represent. As the current chapter will focus on possible meanings it will be necessary to consider these images in the broader context of Minoan society. In addition to drawing on the agricultural and faunal evidence discussed in chapter 2 it will therefore also be necessary to consider Bronze Age Cretan religion and ritual.

Representational and literary material from regions with which Crete had contacts during the Bronze Age will also be utilized. The use of such material is widely accepted, as there is irrefutable evidence of extensive interconnections between Greece, Egypt and the Near East throughout the Bronze Age (Smith 1965; Hood 1994:241; Bergquist 1988:32; Dietrich 1967; 1974; 1988; Lambrou-Phillipson 1990).

Evidence from areas and periods only distantly, if at all, connected to Bronze Age Crete will be used for comparison in an attempt to illustrate the range of possibilities. The use of culturally unrelated material for comparative purposes is a contentious issue. Nilsson advocated the use of such material when attempting to identify the religious significance of an object where the meaning is not *...simple and obvious* or *...common to all mankind* (1950:7). The *...simple and obvious* meaning of an object may however vary from one context to another and the assumption that the meaning of an object is *...common to all mankind* may detract from the diverse and complex meaning of objects in different contexts. For example, the functions or potential functions of a bowl may be instantly recognizable to all mankind but to equate recognition with a full understanding of the meaning of a bowl in all contexts is to deny the complex and diverse potential meaning of the object. It is therefore essential to draw on diverse comparative evidence in order both to clarify our own perceptions of the norm, and to understand more fully the range of possible meanings (Kirk 1970:1-2, 28; Goodison 1989:2). The use of such evidence provides us with what Meskeel describes as a *...valuable non-western perspective* (1998:57-8; Buxton 1994:88; Berggren & Harrod 1996:72-3). Comparative material should however be used with caution and it is important not to substitute ideas derived purely from this source for detailed study of the original material (Nilsson 1950:9; Ucko 1968:417, 420).

Minoan Religion

The following section seeks to address two areas of particular importance to the question of whether the image of the cow and calf had religious connotations. These are (i) the role of animals in religious and ritualistic iconography and (ii) the importance of anthropomorphic and zoomorphic interpretations and representations of the female.

Animals in Minoan Art and Religion

In terms of both the number and range of images, animals feature prominently in Minoan art (Immerwahr 1990:96). Although little quantitative analysis has been carried out, it has been demonstrated that animals are represented twice as often as humans on EM three-sided prism seals (Effenterre & Effenterre 1974:28). This section will consider the depiction of animals, their iconographic and social contexts and the range of proposed meanings. As, however, this thesis is concerned with the representation of a particular species rather than animals *per se*, this will take the form of a survey rather than an exhaustive discussion.

It has been argued that representations of animals, primarily birds and snakes, are depictions of a Minoan Goddess in theriomorphic form (Evans 1921b:508-9; Dietrich 1967:409; Hawkes 1968:139,276; Nilsson 1968:330-340; Dickinson 1994a:279) while the male aspect of divinity is symbolized, represented or perceived as a bull (Zeuner 1963a:235-6; Platon 1966:183; 1981:210; Pötscher 1990:74-75). In contrast, some contend that representations of animals provide us with insufficient evidence to suppose the existence of gods perceived or represented in theriomorphic form (Matz 1961; Louloupis 1979; Burkert 1985:40; Åström 1988:10). Palmer discussed possible references to theriomorphic gods in Linear B texts from the mainland, suggesting that these may indicate the existence of a horse god (1963:277-8), a dove goddess (1963:262), bull, cow and hound gods (1984:1). Chadwick argues against this interpretation of the text on linguistic grounds and adds that images of horses, bulls and dogs do not serve to ...*bolster up* [sic] *this fragile argument* (1988:198-199).

It is indeed true that the comparison of Linear B texts and images must be treated with caution. The combination of literary and visual evidence may add weight to a particular interpretation but in emphasising the similarities it is important not to overlook the differences. Apparent contradictions should be considered in detail as they may represent intentional ambiguity, different aspects of a general theme or different functions of the

animals within the broader social context.¹

The concept of the theriomorphic god and especially of the bull god, however, may all too easily efface the very important distinctions between a god named, described, represented, and worshipped in animal form, a real animal worshipped as a god, animal symbols and animal masks in the cult, and finally the consecrated animal destined for sacrifice.
Burkert (1985:64)

To determine the potential meaning of a visual description of an animal it is essential to consider how the animal is positioned in the field of decoration and how it relates to the other elements of the image. Other features within the field may serve to define a setting. During the period of transition between the Middle to Late Bronze Age the images become visually more complex and we see the beginning of the inclusion of additional details. These include architectural and natural elements, possibly indicative of specific meaning relating to location (Crowley 1989b:207). For example, the representation of birds on or above shrines has been interpreted as indicative of avian religious significance (Evans 1921b:440, 1931:13; Long 1974:36, figs. 36 and 37; Goodison 1989:fig. 98j [No. 174]).



Fig. 5.1

The inclusion of other elements in the field of decoration including figure-of-eight shields (CMS I sup. 91; II3 212, 337; VII 100), axes (CMS II3 11, 310; XII 250 [fig. 5.1]; XIII 15) and linear signs, such as impaled triangles (CMS VII 100; XI 84; XII 237), may also indicate specific meaning (see also Gill 1966:12-14).

Represented interaction between animals and people may also prove a key factor in defining the meaning of the individual participants in a particular context. Prepalatial representations of lions and dogs with people and other animals that are thought to be religiously significant has led some to conclude that in such contexts, dogs and lions also have religious significance (Goodison 1989:50, 52, figs. 105a-d, 112b-h.). In LM iconography, griffins and lions are represented flanking female figures described as priestesses or goddesses and have thus been

interpreted as the guardians or animals of the goddess [Nos. 175-178] (Evans 1921b:159; Reusch:1958; Dietrich 1967:409-10; Marinatos 1993:196). In other cases it is the perceived religious significance of the animals that is taken as an indication that the image as a whole has religious or ritualistic significance. For example, in addition to being described as a theriomorphic goddess, the snake is also assumed to have religious significance (Evans 1931:10, 1935:152-4; Warren 1973:142; Goodison 1989:51) and its presence around the upper torso and shoulders of EM anthropomorphic vessels has been described as strengthening the argument that these figurines are thematically associated with the LM snake goddesses (Dickinson 1994a:264).

Within specific contexts images of animals may be associated or juxtaposed with other separate representations of animals, humans or objects. This may be indicative of particular significance. It has been proposed that images on different faces of the same seal and different walls of a single room may convey common themes or even a narrative (Marinatos 1984:112, fig. 73; Weingarten 1989a:299, fn.1). Weingarten has argued that the three faces/images on Late Bronze Age three-sided prism seals are often elements of a common hunting and sacrificial theme (1989a). Marinatos provides a comparable interpretation of CMS II3 13 [No. 94] showing a man's head on one side and a calf on the other which she interprets as the juxtapositioning of a priest and sacrificial victim (1993:130; cf. CMS XIII 22D). Younger suggests that this example may be indicative of sacrifice or butchery (1998:7) while Bloedow interprets this as an image of a hunter and his prey (1996:36).

The medium in which a particular image is represented may also affect how it is perceived as the form, material, origin and level of craftsmanship can all affect how the animal is represented (Clottes 1989:28). In addition, the choice of animals represented may be influenced by the function of the object. For example, in terms of both composition and subject matter, the use of scenes of animals and men hunting to decorate Bronze Age dagger blades is both prominent and appropriate (Hood 1994:figs. 178-180). Regarding the interpretation of theriomorphic vessels and figurines it has been suggested that the function or potential function of the vessel within the ritualistic or religious context implies specific meaning or relates to the function of the animal within that particular social context (Warren 1973:141; Goodison 1989:fig. 100; Fowden 1990:16; Guggisberg 1996:374). In the case of cattle, Peatfield suggests that the symbolism or meaning of cattle figurine offerings may be distinct from the meaning of taurine palatial iconography (1996:119).

Understanding the context in which an image is found may be vital to the interpretation of meaning (Odak 1989:166-7). The dedication of animal figurines in religious environments has been interpreted as a desire on the part of the dedicant to increase or sustain the fecundity of flocks (Ucko 1968:424-5; Marinatos 1993:95, 125) or to secure good luck in hunting (Branigan 1970:112) by providing the deity with a pleasing gift.² Figurines found specifically in funerary contexts have been interpreted as substitutes for or representations of sacrificial victims (Marinatos 1993:30; Marcus 1996:287). There may however, within a single context, be multiple reasons for the dedication of figurines. This is exemplified by aboriginal art where rock paintings of animals may be executed for a wide range of reasons including thanks for successful hunting and as part of *increase ceremonies* (Haskovec & Sullivan 1989:61).

Individual parts of an animals' bodies may be combined to create composite creatures (discussed below) or represented in isolation. Heads are represented most frequently (birds: CMS VII 207; cat: X 280; goat: I 420; dog: I 420; bull: II2 36, 111, 120, 211, 265; II3 11, 149; IV 168, 224; VIII 20; X 68 [fig. 5.2]) but skulls (CMS XI 142; XII 12, 46, 60, 65, 71, 84 [fig. 5.3]), horns (CMS VIII 20) and limbs (CMS II1 296; CMCG 3) are also depicted.³



Fig. 5.2



Fig. 5.3

These images may convey specific meanings associated with particular parts of the animal or the animal as a whole. Branigan has suggested that amulets in the form of animal limbs might be examples of synecdochism (1970:96; Lorblanchet 1989:114-5; Pötscher 1990:67). These individual elements may also be combined with other anthropomorphic, theriomorphic and animistic elements to create composite images or creatures whose meaning is probably derived from the meaning of the different elements and the manner in which they relate to each other (Weingarten 1983:65-74; Schrimff 1989; (discussed below)).⁴ In addition to fantastic creatures composed of diverse elements, in some cases the features of different breeds within a single species may be combined. This type of combination was identified in the representation of the birds on the Frieze of Partridges and Hoopoes, The Pavilion of

Caravanseria, Knossos. The partridges have red legs and gorgets carried down from the eye to the throat. They are also represented with spurs, not a feature of this type of partridge [fig. 5.4] (Evans 1928:110, frontispiece).

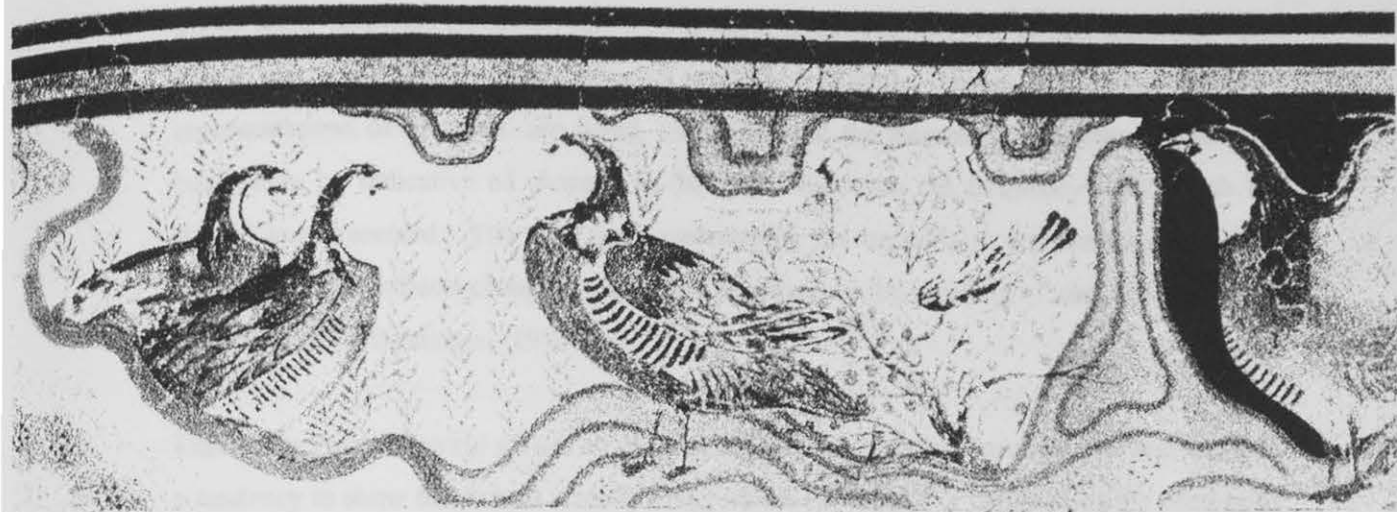


Fig. 5.4

Different breeds of a single species of animal may have conveyed different meanings. This was recognised by Evans who identified several different types of snake in Minoan art which he claimed had distinct meanings (1931:25).⁵ The emphasis on or understatement of specific anatomical elements may convey specific meaning. For example in the clay models of cattle made by the Pokot peoples (Nilotes) the bulk, hump and horns are emphasised, reflecting their primary concerns with the appearance of real cattle while legs and hooves receive little attention (Coote 1992:262, fig. 10.8). In discussing Kenyan rock art, Odak draws attention to the prominence of sexually distinguishing features including teats and the disproportionately high amount of detail on horns, reflecting concerns with the sex and fecundity of animals (1989:173).⁶ The majority of Bronze Age Greek figurines of cattle are however of indeterminate sex, age and breed. Such figurines were no doubt often intended to represent 'cattle' rather than specifically bulls, cows, young cattle, calves, oxen, wild, feral or domestic cattle. In other cases, the social, religious or ritualistic context of the image would have defined the sex and type of animal.

The frequency and way in which different animals are represented in Cretan art changes throughout the Neolithic and Bronze Age. Such modifications and variations in the image have been equated with changes in meaning. Goodison has suggested that the quantity and range of goat imagery dating from the Prepalatial Period is indicative of complex and diverse religious significance while the decline in both the quantity and range of images during the Palatial Period is indicative of decreasing importance (1989:52-3, 82). She further concludes

that cattle, represented less frequently than goats during the Prepalatial Period, ...*gradually replaced the goat over time* (Goodison 1989:54; Evans 1901:84). This is possibly an oversimplified interpretation of the evidence. The study of three hundred EM three-sided prism seals, to which Goodison refers (Effenterre & Effenterre 1974:28-29) identifies fifty-five to sixty-five representations of goats and only five cattle. However, a further fifty-five representations of bucrania⁷ are listed, indicating that the increase in the representation of cattle may be indicative of changes in the way rather than the frequency with which the animal is represented. The shift from representing the bucrania to representing the whole animal possibly reflects changes or a shift in emphasis in the meaning of cattle iconography, as suggested by Brannigan (1970:110).

During the Palatial Period we see an increase in images of conflict between man and animals, a tendency to show the animal actually being sacrificed, hunted or captured or the dead body being held up, carried (Goodison 1989:113, 114, fig. 268a, b) or bound. Goodison relates these images to the emergence of the image of a 'master' or 'mistress' of the animals and sees this as an aspect of ...*the expression of domination (of man) over living animals* (1989:114-15).⁸ As discussed above however it is possible that similar concerns were expressed by the juxtapositioning of men and animals on different faces of single seals [No. 94] (Weingarten 1989a:299, fn 1; Marinatos 1984:112, fig 73) and the earlier predominance of images of bucrania and cattle heads may actually represent a different way of expressing the same type of concerns or relationship. The changing way in which these concerns are expressed may be indicative of changes in belief and concerns but may also reflect technical developments which enabled the artist to show more complex images of groupings and interaction than was previously possible.

Changes in the way an animal is represented in a particular medium may also reflect changes in the function and meaning of the object. For example, During the LM IIIB-C period there is an increase in the production of large-scale (up to 50cm long) wheelmade bull figurines. Kourou and Karetsoy attribute this to possible changes in cult activity, suggesting that this type of figurine served as ...*a substitute of the real sacrifice* (1997:115).

The diversity and complexity of animal images reflect the importance of animals in all areas of Minoan society. The wealth of material provides scope for extensive research and the ideas discussed in this section reflect numerous approaches and agendas. Although Goodison is right to emphasise that few, if any, of the proposed interpretations of the images are set in

concrete (1989:51), the overwhelming wealth and diversity of evidence suggests that animals and animal iconography played a central role in both religious and secular life. Beyond this, the complexity and diverse ways in which individual species, including cattle, are represented, emphasises that they probably had multiple meanings and as Burkert (1985:84) asserts, the issues surrounding these images are far more complex than whether it is possible to identify theriomorphic gods.

The Female in Religion

The identification of a goddess or goddesses is a frequently debated area of Minoan religious study. As this thesis is concerned with the cow and calf image and therefore the fertility and nurturing aspect of the female, a key area of *Goddess Theory*, it is important to address the issues.

The emotive subject of the 'Mother Goddess' has featured prominently in the study of religion throughout this century and is based on the belief that a supreme mother goddess concerned with fertility and regeneration was originally at the heart of all human religion and society and influenced all subsequent religious practices and beliefs. Although the work of every researcher is founded on certain biases and preconceptions the issue of the goddess is particularly controversial and has been approached by scholars from many different disciplines. Specific religious,⁹ political, social and academic agendas ranging from the overt to the tempered therefore cloud the issues. From the Classical period onwards there is clear evidence that the Mother Goddess has played a prominent role in European religion. Some have suggested that during the twentieth century we have projected this prominence back onto prehistoric remains (Ucko 1968:410; Cauvin 1972:9-10; Dickinson 1994b:174-5). The Goddess concept has indeed served as the basis or starting point of numerous studies relating to past societies, for example, Mellaart's selective use of the figurines and images from Çatal Hüyük to present a monotheistic goddess centric society (1963:49, 78; Meskell 1998:51, 59).¹⁰

Since the 1960s, feminist theory has featured prominently in goddess literature (Hamilton 1996:283). This has had the positive effect of addressing many hitherto overlooked issues relating to the role and status of women in ritual and the wider society and has served to shift the emphasis away from the purely sexual characteristics of figurines (Goodison 1989:5-6; Hamilton 1996:283). To focus on the female/goddess as a distinct area of research can however result in an essentialist approach being adopted. In the most extreme cases the

figurines or images are removed from their social and find contexts and studied as a homogenous group (Tringham & Conkey 1998:22). This is evident in Gimbutas' identification of themes common to images spanning 35,000 years and large areas of Europe, described by Meskell as a *universalising gynocentric narrative* (1998:53; Berggren & Harrod 1996). The comparison of images from different contexts is an important aspect of any study and many of the themes and ideas discussed by Gimbutas are greatly enriched by the breadth of material she covers (Berggren & Harrod 1996). The decontextualised ancient image may however present us with a false idea of the importance of the image in its original context (Haaland & Haaland 1996:296; Wood 1996:20). For example, contrary to the emphasis placed on the subject by Gimbutas, the geographical range of the European Mother Goddess has been shown to be limited (Fleming 1969:255).

Such images have, during the late twentieth century, been adopted as both religious and secular icons and presented to modern society as evidence of matriarchal societies or even past utopias (Hawkes 1968 (see below); Wood 1996:9, 12-13, 19; Haaland & Haaland 1996:297,299).¹¹ It has however been shown that although the presence of a goddess or goddesses may reflect or be related to specific roles played by women in particular societies, it cannot be taken as indicative of general status (Goodison 1989:65; Goodnick Westenholz 1998:63).¹²

The Interpretation of Prehistoric Greek Images of Women

Female anthropomorphic figurines are represented in all regions of Greece throughout the Neolithic and Bronze Age. The interpretation of these images has proved contentious and it is therefore important to consider the range of possible meanings before looking at specific Minoan examples. It is in the discussion of Cycladic anthropomorphic figurines that we find the potential meaning of the images most adequately elucidated. Barber summarises the possible interpretations of Cycladic figurines found in graves as (1987:130-132):

- 1) Personal possessions; valuable to the individual during life.
- 2) Figurines intended to serve as servants or concubines in an afterlife.
- 3) Gifts for the deities, representing deities, servants, worshippers or possibly the occupant of the grave.

Renfrew, in a discussion of anthropological figurines found in Cycladic sanctuaries, identifies four distinct categories of possible meaning within the broad concept of cult image (1985:22-23):

- 1) Representations of anthropomorphic deities.
- 2) Representations of *abstract deities* who may take a variety of not necessarily anthropomorphic forms.
- 3) Votaries; images of worshippers.
- 4) Votive figures or offerings, dedicated to the deity and representing humans or deities.

These categories illustrate not only the importance of the specific find context, but also recognise the diversity of potential meaning and interconnection between the different areas of religion and ritual (Warren 1973:140-141(see below); Fowden 1990). There have however been further proposed interpretations that should be considered. Goring, in relation to third millennium BC. figurines from Lemba, Cyprus, states that a ritualistic context can indicate that figurines represent the concept, rather than a goddess, of fertility and that such figures may have been used in initiation rites, as teaching aids, or as charms or talismans (1991:54-55). This assessment is comparable to Ucko's discussion of Neolithic Cretan figurines in which he states that *...no evidence has been found to support the view that they represented a Fertility Goddess although some may well have been associated with a desire for children* (1968:444). He further proposes that they may in fact be dolls, initiation figures and *...vehicles of sympathetic magic* (1968:434-436). Others have suggested that individual figures represent specific people or served as contractual devices (Hamilton 1996:284-5).

The Minoan Goddess?

In the *Palace of Minos at Knossos* (1921-1936), Evans claimed that Minoan religion was monotheistic and headed by a female deity. This assertion was based on an extensive study of the material primarily retrieved from excavations at Knossos, the predominance of female statuettes and imagery in this assemblage and comparisons with Near Eastern and Egyptian religion. He interpreted the diversity of images as representations of the different attributes and guises of the goddess. He later, however, acknowledged the possibility that Minoan religion was polytheistic but stated that *...as a provisional procedure it is convenient in default of more definite knowledge...* to treat the differences as different aspects of the same god (Dickinson 1994b). Many subsequent scholars have followed Evans' original monotheistic interpretation of the evidence (Reusch 1958; James 1957, 1959; Hawkes 1968; Waterhouse 1974; Fowden 1990; Marinatos 1993:193). Hawkes (1968:31), for example, uses Evans' assertions as the basis of speculation about the attitudes and status of Minoan women. She describes the women of the *court* at Knossos as idling around gardens in

flounced open-bodied robes, their ...*confidence and liveliness...surely enhanced by the presence of the Great Goddess*. She further describes the *Goddess* as providing ...*the psychological foundations of this strangely feminine society* (1968:131). Others suggest that the dominance of the woman in Minoan religious iconography indicates that they dominated the government of the island and that the ruler was probably a priestess (Reusch 1958:356-7; Platon 1966:184; Waterhouse 1974). The prominence or absence of a female element in a particular religion does not however necessarily reflect the status of women in that society (Meskell 1998:53).

Those who support the view that Bronze Age Greek religion was polytheistic point to the variety of representations, evidence from Linear B tablets and later Greek polytheistic religion (Nilsson 1950; Warren 1973, 1986; Chadwick 1988:195-6; Dickinson 1994b:174, 259). Warren suggests that polytheism evolved in Crete as early as the EM period (1973:144, 1986:4) and, in a study of anthropomorphic vessels, he distinguishes both a goddess of fertility, associated with the later mistress of the animals, and a goddess of the household (1973:142-3; Branigan 1970:113; Gesell 1981:94).

In the following section we will consider not only the question of polytheism but also how the monotheistic/polytheistic debate surrounding anthropomorphic figures and images detracts from other areas of possible significance. As the group of anthropomorphic vessels analysed by Warren is of fundamental importance to discussion it is necessary briefly to describe the group and Warren's interpretation. It consists of four vessels from Koumasa [No. 179] and one each from Mallia, Mochlos [No. 180], Myrtos, Ayios Myron, the Pyrgos Cave [No. 181] and the Trapeza Cave (Warren 1973:138-139). Five of the vessels have spouts set at the shoulder and open to the interior while the example from Myrtos holds a jug that opens into its body. The figure from the Pyrgos Cave carries two open bowls. Neither of the figures from Mallia or Mochlos carries or incorporates a vessel yet both have pierced tubular breasts that open to the interior. A further two anthropomorphic rhyta have been discovered in the Area of the Rocks, Archanes. One is female (breasts indicated) with a spout set in the shoulder while the other larger figure, in addition to a spout on the shoulder, has another protruding from the front of the body [fig. 5.5] (Sakellarakis & Sakellarakis 1997:540-541, figs. 538-9).



Fig. 5.5

In addition to these attributes, two of the figures from Koumasa and the one from Mochlos are adorned with snakes and the larger figure from the Area of the Rocks, Archanes wears a conical hat which has been described as relating to priesthood. Small animals are represented on the front and back of the figure from the Pyrgos Cave [No. 181]. Warren describes this final example as comparable to a seal from the Diktaian Cave where two animals to either side of a female figure raise their heads towards her breasts as if to suckle (Evans 1935:fig. 130) [No. 177]. Warren is correct in his assertion that it is the implication rather than necessarily the action that is the important element of the image (1973:142; Larson 1995:122). Similarly, Van Loon, in his discussion of the images of naked goddesses clasping their breasts from 2nd millennium Anatolia concludes that this is a *...gesture suggesting a mother about to feed her child* (1985:1-3), while in later Greek images, Hera is represented offering her breast to Herakles as a sign of reconciliation (Burkert 1985:133). The implied, rather than the represented action is also a key element of the representations of animals suckling young discussed in chapter three, where, in the majority of images, the young reach up to the area of the udders or nipples but are rarely represented actually suckling. For example, of the examples of cows suckling calves from Crete, only in Nos. 1, 5 and 21 is the calf represented actually suckling

Warren's survey of the EM-MM anthropomorphic vessels is of paramount importance to any study of the development and potential meanings of the objects. However, despite emphasizing the complex meaning of the vessels, Warren focuses on the issue of whether they represent goddesses, an idea disputed by others (Goodison 1989:42; Dickinson 1994a:264; Goodison & Morris 1998c:117). Although this question is an important aspect of the study, to concentrate on this area can lead to an oversimplification of the issues (Fleming 1969:255, 259; Dickinson 1994b:173; Haaland & Haaland 1996:297). This in turn detracts from the fuller potential meaning of the image. The perceived boundaries of the

term 'goddess' can prove restricting and a fuller understanding of issues of fertility, nourishment and regeneration demands that the analyst resists the temptation to concentrate on the search for a goddess and instead considers the broader context and range of possible meanings. The advantages of adopting such an approach are widely evident in recent works (Fleming 1969; Goring 1991; Goodison & Morris 1998a).

Rather than concentrating on whether they represent goddesses, in her discussion of the female-shaped vessels, Goodison considers whether the form and function of such vessels may be related to notions of the female body being conceived as a vessel. She further adds that the addition of breasts may have been an indication of the association between female, fertility and vessel (Goodison 1989:42, 98; Fowden 1990:17),¹³ comparable to Egyptian representations of Taurt and Hathor in the form of vessels (Goodison 1989:42, 98, 101, 105, figs. 242b¹⁴; Bleeker 1973:28, 103). A similar breadth of concern is expressed in the names of anthropomorphic Sumerian goddesses Ninhursaga 'the mother of the land' and Inanna (Akkadian name: Ishtar) 'The goddess who incarnated fertility' (James 1959:48) and the Hindu goddess Uma who is connected both with women conceiving and plants growing (James 1959:105).

In focusing on the anthropomorphic figures in a particular assemblage we often neglect or underestimate the potential meaning of other objects, including representations of animals. For example, Ucko refers to Kenyon's analysis of figurines from Jericho, in which she concentrates on the potential meaning of anthropomorphic figurines, concluding that animal figurines are more likely than their anthropomorphic counterparts to be children's toys (1968:421).¹⁵ Ucko describes her distinction between anthropomorphic representations of deities and theriomorphic dolls ...as *conjectural and illogical* (1968:422). A similar discrepancy between how we interpret depictions of animals and humans can be seen when we consider the discussions surrounding other objects found in the same funerary and ritual contexts as the anthropomorphic vessels described by Warren as representations of goddesses (1973:138-9).

Warren discusses an example from tomb XIII on the Island of Mochlos [No. 180]. The original archaeological report (Seager 1912) shows that the contents of this tomb are very similar to those of another MMI burial (tomb XI). Both contain stone and clay vessels. Tomb XIII also includes two bronze blades while tomb XI contains a bronze dagger. The main difference is that the anthropomorphic vessel discussed by Warren was discovered in

tomb XIII while a bull rhyton with small figures attached to the horns was recovered from tomb XI. In his excavation report, Seager compared the anthropomorphic vessel found in tomb XIII to Cycladic figurines and described it as a ...*primitive nature goddess* (Seager 1912:64). In contrast, he described the bull rhyton from tomb XI as a vessel (1912:60). The possibility that this is a theriomorphic deity or theriomorphic representation of a god is not even considered by Seager. Subsequently Matz suggested that the bull rhyton had religious significance but concluded that it probably represented a sacrificial bull as the image is too naturalistic to be indicative of a bull god (1961:222). Matz does not explain which particular aspects he believes to be too naturalistic to represent a god and indeed, why this criterion is relevant to the determination of what the image represents.

The range of anthropomorphic, theriomorphic and animistic vessels and the problems of interpretation are evident at the funerary site at Koumasa. In addition to the four anthropomorphic vessels [No. 179] discussed by Warren and two other anthropomorphic vessels described as male (Xanthoudides 1924:12-13; Pendlebury & Money Coumts 1935-36:94), the site provides extensive evidence of theriomorphic vessels. These include possible bovines (Xanthoudides 1924: Tomb 4140, Tomb 4141) a tortoise (Xanthoudides 1924:Tomb 4146) and two birds (Xanthoudides 1924: Tholos A, Area Δ 1423). A vessel recovered from the earth covering Tholos E was described by Xanthoudides as having the sides ...*pinched into ears or horns* and a handle representing ...*a nose or snout* (1924:39-40; HM 4992). After comparing this vessel with similar examples from elsewhere, Xanthoudides concluded that this type of vessel is ...*in some way sacred, as symbols of a kind, or even as primitive figures of the Minoan Goddess* (1924:40). A bull shaped rhyton with figures attached to the head and horns was recovered from tomb 4126, Area Δ [No. 182]. Also from Area Δ come HM 4115, 4116 [fig. 5.6], 4117, two jugs and the neck of a third which, like the bull rhyton, have attached anthropomorphic figures (Xanthoudides 1924:40-41). The vessels also include what appears to be a composite animal vessel found in Area AB, which has the body of a bird and the head of a ram (HM 4124). Two vessels from Area Δ, although described as birds because of the inclusion of wings and gaping beak-like spouts, not only retain obvious jug-like qualities but also both stand on four legs (HM 4121 [fig. 5.7] & 4122).



Fig. 5.6



Fig. 5.7

The variety of vessels from this particular site emphasizes that the distinction between anthropomorphic, theriomorphic and animistic vessels is artificial and that the meanings of the individual types are no doubt interwoven (Dickinson 1994a:264; Bailey 1996:291-2;). This emphasizes the artificiality of the distinction we make between the three areas and reminds us of the complex nature of Minoan iconography. To restrict the discussion of possible representations of deities within an assemblage to anthropomorphic images is to overlook the potential meaning of theriomorphic and animistic elements and objects. Both theriomorphic and animistic deities are attested in other regions during this period. In the Ugaritic *Baal Cycle of Myths* (KTU I.4 vi 47-54) Baal is described as making offerings to ram-gods, ewe-goddesses, ox-gods, cow-goddesses, siege-gods, throne-goddesses, amphora-gods and jar-goddesses, the latter described by Wyatt as *...the apotheosis of the cultural and economic realities of Ugarit* (1998:107 n. 149). The diversity of vessel types at Koumasa may reflect a similar range of concerns and it is therefore important, while recognising the possible religious significance of anthropomorphic vessels, not to overlook the similar potential meanings of theriomorphic, animistic and composite vessels.

In stating that *...the conceptual spectrum implied by the human and animal vessels extends beyond funerary practice to encompass wider concerns of fertility and regeneration*, Marinatos (1993:17) emphasises that the vessels may reflect a wide range of concerns expressed in a variety of ways including theriomorphic imagery. A similar breadth of concern is acknowledged by Goodison who emphasises the associations between birds, *...sun, women and death* (1989:49-50) while Marinatos has suggested that insects and molluscs were symbolic of regeneration (1993:194-6). Bees, butterflies and snakes have been linked with the theme of death and renewal (Evans 1931:28; Dietrich 1974:119-122; Goodison 1989:51). In conclusion, the evidence suggests a *...pluralistic, rather than*

monotheistic basis for Aegean religion (Goodison 1989:10), a religion in which anthropomorphic, theriomorphic and animistic elements all play vital and interconnected roles.

The following sections of this study will focus on the possible meanings of young cattle, calves and the cow and calf in Minoan art. In order to gain a fuller understanding of their potential meaning the images will be considered within their broad religious and social contexts, rather than in isolation. The evidence relating to the diverse role and meaning of theriomorphic iconography and the apparent importance of the female in Minoan religion will be of particular relevance.

Cows, Calves and Young Cattle in Minoan Art

The association between the cow and goddess is attested throughout the world, from India where the cow is linked with the goddesses Aditi, Lakshmi and Parvati to Northern Europe (James 1959:124; Lodrick 1981:6; Davidson 1996:91). In Egypt the cow was associated with and represented a number of goddesses including Isis, Neith, Nut and most frequently Hathor (Bleeker 1973:22, 31; Houlihan 1996:19; Hassan 1998).¹⁶ In the Ugaritic text, the union of Baal and Anat is described as that of a bull and cow (*KTU* I.10 iii 15-23, I.13 V 30), Baal subsequently being described as having intercourse with a heifer (*KTU* I.5 18-22) (James 1959:75; Wyatt 1999:181).¹⁷ It is tempting to use such evidence from regions with which Crete had contact during the Bronze Age as the basis of a quest for a Minoan cow goddess. Although the following discussion will address the issues of whether the image of the cow and calf in Minoan art reflects a link between a specific deity and the cow or even the presence of a cow goddess, this will not however serve as a focus. The intention is rather to consider the range of possible meanings of the image of the cow and calf in all aspects of Minoan society.

In order to understand the potential meaning of images of animals it is necessary to consider other elements in the field of decoration, the medium in which they are represented, the possible function of the image or object and the depositional factors and contexts. The relevance of these factors was recognized by Evans who distinguished between the meaning of the cow and calf faience plaques and the image on seals and sealings. After comparing the plaques with Egyptian equivalents associated with goddesses, Evans stated that they probably had *...religious intention in connexion with the Cretan Mother Goddess*, but were not theriomorphic representations of a goddess (1921b:513; 1935:552). He stated that the find

context of the faience plaques, the Temple Repositories, Knossos indicates that the Palace cult ...*had a direct relation to that of the Delta Goddess Wazet, a form of Hathor* (1935:554; 1931:10).

Others have interpreted the plaques in similar ways. Levy suggested that they were offerings made to a mother goddess (1946:230). Gesell concludes that the association of the plaques, representations of fruit, marine life and seashells with goddess figurines in the Temple Repositories indicates their religious significance, probably relating to the goddess' control of fertility (1981:95). Hawkes goes a step further in describing the faience plaques of the cow and calf and goat and kid as representations of the goddess in the form of an animal mother (1968:101).

In discussing the seals and sealings, Evans suggested that the cow and calf may have a protective aspect, comparable to a Syrian scaraboid carved with the image of a doe suckling a fawn and the inscription *Astartê is my strength*. (1935:555). In Egypt, models of pigs suckling piglets, associated with Nut and Isis, served as lucky charms and were thought to bring their owners both general and fertility-related good luck (Houlihan 1996:28-29, fig. 22) while in later Greek tradition, the pig, the holy animal of Demeter, was seen as a fertility charm (Nilsson 1940:25). Branigan suggested that EM *amulets* in the shapes of animals were intended to ensure the well-being of the type of animal they represented (1970:95) while Younger cites evidence of sealstones being used as charms in relation to the production and storage of oil and wine (1977: 143, 158). The image of the cow and calf in Minoan glyptic may have had similar talismanic significance relating to the protection and promotion of fertility and regeneration. Evans records how ...*Cretan mothers of our times for their own physical needs... wear ancient cream coloured seal stones as milk-stones* (1935:446). Although Evans does not describe the images on such stones and appears to suggest that it is the milky colour and age of the stone rather than the image that are the key factor in the attribution of talismanic powers, it illustrates the talismanic potential of the medium, relating in particular to the fertility and nourishing capacity of the female. An interesting Bronze Age comparison comes from a LM III A2-B tomb at Armenoi, near Rethymnon where a necklace of beads was found to include a crystal lentoid decorated with a cow and calf (Younger 1977:146).¹⁸ In terms of function, material (colour) and theme this example bears a striking resemblance to the later Cretan evidence cited by Evans and the stone was possibly used as a talisman in relation to similar concerns.

Animals associated with religion and ritual and theriomorphic gods are often represented with additional attributes to distinguish them from non-specific animals (Bleeker 1973:23). In Egypt, when the goddess Hathor is represented as a cow, she is distinguished from other cattle by a head-dress (the sun disc and viper) and in some cases the *mnj.t* necklace (Bleeker 1973:22, fig. 1; Gosline 1996) [No. 183 & 184].

Earthly animals singled out for sacrifice are also often represented adorned with ribbons and head-dresses. In Minoan representations of the cow and calf neither animal carries distinctive ornaments or bears distinctive emblems. The only exception to this is No. 40 which, despite being found in an Archaic Libyan context, has been described as Minoan. In this image a triangle is represented on the hindquarters of the cow which Gill (1966:11-12, fig. 5) describes as possibly related to the Linear signs identified by Kenna. On the whole, however, the images of cows and calves are highly naturalistic. Matz's argument that the bull rhyton from Mochlos is too naturalistic to be a representation of a bull-god (1961:222) prompts the question of whether it is possible to argue on the same grounds that the Minoan representations of cows and calves are of earthly rather than divine cattle.

Although the cows and calves do not appear to have distinguishing features, additional elements in the field of the image and the description of settings may indicate specific meaning. As a single species of animal can have multiple meanings in a particular society, placing the animal in a specific setting within the image may serve to clarify exactly what type of animal is represented and the potential meaning of the image (Crowley 1989b:207-8, 210). Evans concluded that the nanny and kids represented on the faience plaque are wild, the rocky base indicating a rural setting and that they *...naturally associate themselves with the Cretan Goddess in her capacity of divine huntress* (1921b:510-11, fig. 366). Earlier discussion (chapter 3) of the baselines on the ivory plaque and mirror handle (Nos. 4 & 5) concluded that they are indicative of rocky settings and therefore possibly reflect similar concerns. The cow and calf on the faience plaque are however set on an architectural base. Evans concluded that this element of the image points us in a completely different direction (1921b:511). If the rocky base on which the goats are set is interpreted as defining the image as one of wild animals in a rural setting, it follows that the architectural base on which the cow and calf stand is indicative of a man-made environment, whether architectural or agricultural. The same logic can also be applied to the image of a couchant calf on a brick-like base (No. 107). Placing the cow and calf in this type of setting suggests a range of potential meanings. It may have been the intention to indicate that the animals are captured

or domestic, in the same way that representations of animals collared and chained (dog: *AT* 82) or tethered and netted (cattle: *CMS* XII 249; *AT* 60) are indicative of human control without actually representing man within the image. It is also possible that an architectural base may have served to indicate a ritualistic setting or significance. A monkey and griffin standing on an architectural platform in a wall painting from Xeste 3, Akrotiri [fig. 5.8] and birds and seated goats on top of the building depicted on the rhyton from Kato Zakros [No. 174] have been interpreted in this way (Immerwahr 1990:62).

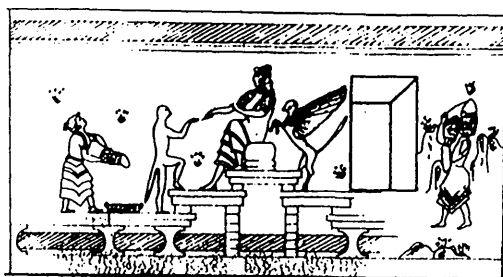


Fig. 5.8

The small-scale and often summary nature of the additional elements in the fields of seals and sealings can make the process of the identification difficult. No. 24 shows three branches above the back of the cow, possibly indicating a tree while in No. 23 there is a faint mark, possibly representing foliage, between the front and back legs of the calf. In Nos. 93 and 110 and possibly No. 95 (see chapter 4), images of young cattle and calves, foliage is represented. In discussing Prepalatial Minoan seal iconography, Immerwahr stated that the inclusion of foliage indicated a natural setting (1990:28; *CMS* II1 64, 70; II5 268, 276). If Evans' interpretation of the rocky baseline on which the goats stand on the faience plaque (No. 61) is accepted as indicative of the animals being wild, it is further possible that similar settings described in Nos. 23, 24, 93, 110 and possibly 95 indicate that the cattle are wild or feral. The representation of cattle with trees may stem from knowledge of the cattle behavioural trait of moving into shade in hot climates to avoid the light (Haupt 1991:94). Palmer suggests that the representation of cattle in a landscape, particularly one including palm trees and vegetation, might be related to the Near Eastern theme of ... *Bull + Vegetation and the connection with water* originating in Mesopotamia (1984:1-3). Similarly Hathor the cow goddess was associated with the tree and vegetation (Bleeker 1973:34-35, 40; Hart 1986:77).

Of the remaining seals and sealings, No. 104, a collapsing wounded calf, is set on an undulating baseline that appears to represent a rural setting an appropriate environment for hunting, while the animals in Nos. 22, 92, 103, 112, 113 and 114 are represented on base lines. These plain bands may have been intended to represent an architectural setting, or are

possibly included purely as a compositional device.

In addition to the setting and other elements within the field, discussed in chapters 3 and 4, the way in which humans and animals interact with other humans and animals is a vital aspect of the meaning of the image as a whole. This was recognized by Groenewegen-Frankfort who stated that during the LM period the anthropomorphic Mother Goddess is distinguished not primarily by *attributes or emblems* but by the way she relates to other figures, primarily in scenes of tribute (1951:215). She further adds that *...if she (the goddess) was ever conceived as a life-giving mother it is striking that no infant ever accompanies her*. James similarly states that the Minoan Goddess was *...never adorned with horns nor represented as suckling her offspring*. In short, in Crete she did not assume the role of the divine cow and its symbolism (1957:239-40). Although there are no images of women suckling children, there are representations of women with children and representations of anthropomorphic figures who appear to be suckling animals [Nos. 177 & 181]. In addition there are also images of animals with and suckling young, and even an image of a child beneath a sheep [No. 185] which has been interpreted as indicative of suckling (discussed in Appendix D). Hawkes claims that the faience plaques of the cow and goat are representations of the *...goddess as animal mother* (1968:101) while Goodison and Morris describe the images of cows and goats suckling their young as *...offering an explicit reference through animal imagery to the mother providing life-giving sustenance to her young* (1998c:125).

The idea of the nourishing mother does not however require that the child be represented. There are numerous images of women and animals where the mammary glands are prominently represented, emphasizing the potential to lactate.¹⁹ Morgan has observed that in Thera wall paintings, mature women are represented with prominent nipples and in the case of the woman who holds out a garment to another in the House of the Ladies, the size of the breasts may be indicative of lactation (1997:39). Similar women are represented in glyptic (CMS I 126 [fig. 5.9], 127, 144, 145, 159, 191), while the anthropomorphic vessels from Mallia and Mochlos [No. 180] discussed above, emphasize the potential to lactate by the inclusion of tubular breasts out of which liquid could be poured. There are also many examples of female animals represented with prominent nipples in Minoan glyptic (Lionesses: CMS II3 122, 173, 302, II4 17, V 304, X 164, 279, 303, XI 115, 242, 317, 322, 323, XIII 26 [fig. 5.10]; CS 314; Bitches: CMS VS IB 58, XI 316; CS 239; Sow: CMS VS IB 117; Griffins: CMS I 128, 269, 271, II3 219, IV 287, V 690, X 220).²⁰



Fig. 5.9



Fig. 5.10

The primary importance of these images is not whether they were associated with or represented a mother goddess but their value as evidence of Minoan concerns with animal, human and earthly fertility, reproduction and nourishment.

Individual animals may have been singled out as having religious significance and the images may therefore relate to the role of such animals in religion and ritual rather than necessarily depicting a theriomorphic god. The association between the cow and sacrifice will be discussed below. This is not however the only context in which individual animals may be singled out for particular treatment. In Egypt, for example, special treatment was afforded the cows which mothered the Apis Bulls. They had a separate burial place at the Iseum, near the Serapeum,²¹ Saqqara and like their progeny were believed to be divine manifestations, in their case of Isis (Houlihan 1996:21). Cows were also kept at temples consecrated to Hathor including those at Momemphis, Kusae and Dendera (Bleeker 1973:33; Ikram 1995:8). Particular animals may also be singled out because of agriculturally related functions. In third millennium Sumeria, for example, temples kept sacred flocks and herds, the milk from these animals being used to nourish royal children (Davidson 1996:91; Goodnick Westenholz 1998:69). In Egypt, herding asses and oxen four times around the walls of the temple was a key element of the *HB SD* festival (Bleeker 1967:103). The priestly costumes worn by the participants in the relief of milking and milk processing from the Temple of the Goddess Ninhursag at El Ubeid (c. 3100 BC.) suggest that this is a scene of religious or ritualistic significance [No. 169] (Amoroso & Jewell 1963:133, pl. XVa).²² Similarly it has been suggested that the feeding of the temple herds, a theme frequently depicted on cylinder seals during the Uruk period in Mesopotamia, was considered a ritualistic act [No. 186] (Goff 1963:61-2, figs. 247-251).

If the Minoan images are of earthly rather than divine cattle we cannot rule out the possibility

that these are representations of specific cattle of religious or ritualistic significance.

The prominence and diversity of cattle imagery in Minoan art may reflect a wide range of concerns and beliefs but cannot be interpreted as indicative of a particular attitude to cattle. Attitudes towards a particular animal may be restricted to individual people, areas or classes and are dependent upon a wide range of contextual factors. For example, cow worship and rituals surrounding the actual animal are commonplace in Hindu households and temples and holy cattle in some regions are allowed to roam unhindered (James 1959:102, 124-127; Lensch 1987:35). In some myths however the cow is described as being beaten (Eichinger Ferro-Luzzi 1987:104-5). Throughout Indian culture there are a wide range of contradictory attitudes to cows and their products (Eichinger Ferro-Luzzi 1987:99-100; Lensch 1987:41). Cow dung is seen as a *potent purifier* but it is only the lower castes that prepare and sell dung cakes (James 1959:125; Lodrick 1981:5; Eichinger Ferro-Luzzi 1987:100). Bleeker suggests that the complex and diverse religious and secular meanings and significances attached to cattle in ancient and primitive societies occurs as a result of frequent contact between man and animal, causing man’s attitude to be ambivalent ... *alternating between affection, respect and fear* (1973:24).

Cows, Calves and Young Cattle in the Agricultural Context

Throughout the Neolithic and Bronze Age, Cretan society was agriculturally based. It is therefore vital to consider how the agricultural importance of cattle relates to both the religious significance of the animals and the frequency with which they are represented. By considering the agricultural implications of the image we can gain a fuller understanding of the reasons for the prominence of the image of the cow and the calf compared to other representations of animals with young [Table 5.1].

	Cow & Calf	Nanny & Kid(s)	Liones s & cub	Bitch & pups	Doe & fawn	Ewe & lamb	Sow & piglets	Quadru ped & young	Total
Crete	19	9	3	1	1	1	0	4	38

Table 5.1. Representations of animals with young in Minoan glyptic

The majority of images of cows with calves show the young reaching up to suckle. The image may therefore be intended to emphasize the value of the cow as a source of milk. If this were the case however we would expect more images of goats and sheep with young as

the proportion of cattle to sheep and goat bones in faunal assemblages suggests that goats and sheep played a far greater role in Minoan society as milk producers than cows. Indeed, the only certain representation of milking from the Bronze Age is a sealing showing men milking sheep [No. 172]. In other areas the frequency with which particular creatures are represented have been associated with their importance to the economy. The tunny fish, for example, was the single most important species of fish in the Minoan economy which it is argued is reflected in its predominance in EM marine iconography (Gill 1985:70-71). The *cultural importance* of a commodity cannot however always be explained in terms of its economic importance. In India, for example, milk is of great ceremonial importance, milk and milk products are considered worthy offerings for any god (Eichinger Ferro-Luzzi 1987:110-11, pl. 6, 7) and some Hindu calendars show a half-human, half-cow figure ejecting milk (Lensch 1987:56). Milk consumption is however far lower in India than in North America where milk bears no religious significance (Eichinger Ferro-Luzzi 1987:106).

In India the choice of milk as an offering may relate to the function of a god or goddess and/or reflect human concerns specifically with milk production or with broader issues of abundance and fertility. In the Nagaramma temple in Andhra Pradesh the locals offer the first milk of the she- buffaloes to the goddess in the belief that otherwise the beast will not produce milk (Eichinger Ferro-Luzzi 1987:8). In this case, the milk is indicative of both particular human concerns and the role of the goddess. Warren makes a similar connection between the form of the female vessel from Myrtos which he interprets as a representation of a goddess and the probable concerns of the inhabitants of this hill-top settlement with their water supply (1973:141; Cadogan 1980:21; Fowden 1990:18). The discussion of liquid offerings in Bronze Age Crete usually centres on wine, oil and water (Evans 1935:450-451; Chadwick & Ventris 1973:128; Long 1974:36; Marinatos 1986:22, 28; Warren 1986:4). There is evidence that both honey (Ventris & Chadwick 1973:127; Schoep 1994:7)²³ and blood (James 1959:131; Marinatos 1986:25, 28) were also offered. The evidence for the dedication of milk and dairy products is however limited. Marinatos suggests that milk may have been used (1986:25) while Evans (1935:157) suggested that a mixture of milk and honey (μελικρητον), described as an offering in Homer's *Odyssey* (X 519-20) may also have been dedicated. He further states that in modern Greek popular myth, snakes are fed on milk and honey (1935:153-4).

A wide variety of offerings are recorded in the Linear B tablets from both Crete and the Mainland. These include wheat, barley, flour (Ventris & Chadwick 1973:126), wool (Ventris

& Chadwick 1973:127), figs (Chadwick & Ventris 1973:128; Schoep 1994:7), spices (Schoep 1994:7) and cheese (Chadwick & Ventris 1973:128). These tablets are not however fully understood and it is not clear if and how offerings to the gods are distinguished from provisions for ceremonial meals (Chadwick 1988:200).

A jug containing mixed seeds found in the central chamber of the Archanes Temple and vessels containing carbonised seeds found in the ante chamber with pestles, mortars and tripods suggests that blending and cooking may have been a part of the preparation of offerings (Goodison 1989:40-42; Sakellarakis & Sakellarakis 1997:276). It is therefore possible that milk or processed milk was combined with other ingredients to produce cakes, breads and porridges that were subsequently offered. Indeed Dickinson suggests that clay models of bread and fruit are symbolic of food offerings (1994:27) while Shaw describes a figure represented on a fragment of a rhyton from Knossos as placing or removing *...loaf-like objects from within a large hamper...before a shrine* [fig. 5.11] (1978:441, fig 10)

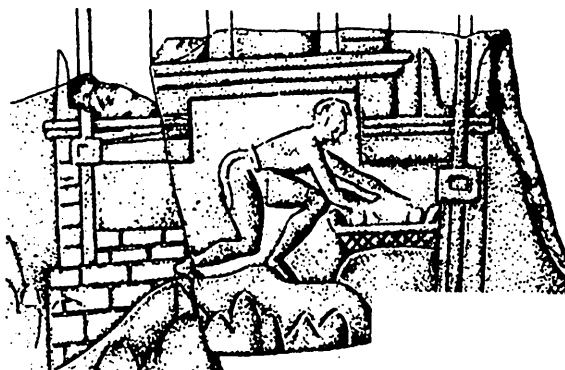


Fig. 5.11

The relationship between women, female animals, deities, liquid commodities and the continuity of life is expressed in many cultures. The Avestan (Iran) goddess Anahita was concerned with fertility and water and was able to ensure easy births and abundant milk (James 1959:94). In ancient Egypt, the image of a cow-headed goddess pouring water is symbolic of the annual inundation [fig. 5.12] (Goodison 1989:46, fig. 93). Hassan states that *Water, cattle, milk and women were the source of regeneration and nourishment* in Egypt (Hassan 1998:105). This applies equally to other Neolithic and Bronze Age cultures including that of Crete.



Fig. 5.12

The evidence is far from conclusive but given the range of commodities dedicated, and the importance of female-related nourishment, epitomized by anthropomorphic female vessels with pierced breasts and representations of animals suckling young, it is likely that milk or milk products were offered to the gods as single commodities, combined or cooked with other ingredients. Later Greek culture provides us with evidence of mixed ingredient offerings (Simon 1983:65, 70), the production of porridges containing milk, breads made with milk and also the need to soak some breads in milk before consumption (Pliny *Natural History* 18. 100-2, 186). This interpretation is further supported by the evidence of cooking equipment in ritualistic contexts (Goodison 1989:40-42; Sakellarakis & Sakellarakis 1997:276) and what Marinatos describes as a clay model showing a woman preparing bread in a funerary context (1993:21, fig 22 (discussed below)). This evidence may however equally represent consumption in a ritualistic context. It is also possible that the dedication of animal figurines may have been symbolic of the specific functions of the animal, including milk production.

To return to the question of the prominence of the image of the cow, Mellaart, in discussing the image of the bull from Çatal Hüyük states that *As a symbol of male fertility an aurochs bull or a large ram was more impressive than man himself* and were therefore used as attributes or symbols of the gods (1969:181). Similarly, the cow was an ideal symbol of nourishment as she has the capacity to provide more milk than any other animal on Crete, including woman. In Egyptian images of the goddess suckling the pharaoh it is therefore appropriate that she either has the attributes or takes the form of the cow, the animal able to provide the greatest quantity of milk, and therefore most nourishment. The prominence of the image among representations of animals suckling young on Crete may therefore similarly reflect not so much the importance of cattle as a source of milk but the capacity of the individual cow to produce more milk than other animals.

The prominence of the image of the cow and calf may further also relate to the wider

agricultural importance and versatility of cattle, fundamental to the Minoan agricultural system. The image of the cow suckling the calf not only represents the cow as a source of nourishment but also the calf as the nourished and therefore the cow as the source of cattle. This is comparable to the situation in India where the cow serves primarily as a source of bullocks (Lodrick 1981:4; Lensch 1987:57-58, 64-65). The wider agricultural importance of the image was recognised by Evans who linked it to the ...*growing importance of the bucolic industry* in Minoan Crete (1935:553). Similarly Warren suggests that the emergence of the 'Mistress of Animals' and horn iconography from the 3rd millennium onwards might have been related to the ...*social and economic needs of cattle and sheep breeders* and general agricultural concerns (1973:145; Rutowski 1986:185) just as in India, where most milk is produced by goats and buffaloes, it is the cow, as the animal on which this agricultural society is based, that plays a central role in agricultural and religious ceremonies, myths and rituals (Eichinger Ferro-Luzzi 1987:99-101; Lensch 1987:26-36). Tambiah states that the fundamental importance of cattle as a source of traction to the village of Baan Phraan Muan, Thailand is reflected in their status as the only animals included in agricultural rituals (1969:437).

Why the cow was selected for apotheosis is obvious to me. The cow was in India the best companion. She was the giver of plenty. Not only did she give milk, but she also made agriculture possible.

Mahatma Gandhi (see Lensch 1987:35)

Even though there may be several reasons for the frequency with which the cow and calf were represented, the agricultural importance of cattle is no doubt an important factor in the prominence of the image. The suckling calf conveys ideas relating to the cow as a source of both young cattle and nourishment. In considering the evidence for Minoan production strategies (see chapter 2) it becomes apparent that the role of cattle as a source of traction was probably of high importance. It is therefore not only as a source of meat and milk that the cow is able to provide nourishment but also, as a source of motive power, it is able to pull the plough and thus enable man to maximize land usage; arable agriculture being the main source of nourishment during the Bronze Age. Peatfield recognizes this potential in his suggestion that the clay cattle with udders recovered from the Peak Sanctuary at Atsipadhes Korakias may be a reference to the use of cattle for traction, in particular the plough, rather than as a source of milk (1996:119).

Agriculture, Religion and Ritual

Images of cows, calves and young cattle in Minoan art reflect concerns relating to the fertility and regeneration of man, animals and the earth, thus emphasizing the inseparability of religious and secular concerns.²⁴ It is therefore impossible to categorize associated rituals and practices, including the hunting, capture and exploitation of animals, as manifestations specifically of agricultural, social or religious beliefs.

In Egyptian and Near Eastern art there is a wide variety of cattle imagery that has been described as possessing multiple meanings and representing both religious and agricultural concerns. Egyptian tombs are often decorated with scenes of agricultural activity. Within the context of the tomb, the depiction of the estates of the dead is an integral aspect of funerary beliefs and rituals. It is not only however the context of the image but also the image itself that may encompass and allude to both agricultural and religious concerns. For example, the Goddess Nut, 'the Lady of Heaven' was often depicted in the form of a cow with the stars of the sky represented on her body. She daily gave birth to the calf/sun and was thus described as 'the cow who bore the bull' (James 1959:59; Luomala 1982:23-24, fig. 6), a powerful image reflecting both religious and secular concerns. The feeding of the temple herds is a recurring image on Mesopotamian seals of the Uruk Period [No.186] and conveys both particular concerns with herds of religious significance and wider concerns with the fertility of all herds and the prosperity of the community (Goff 1963:62). Ihy, the child of Hathor, is represented as a gambolling calf, leading the dancers in the Sed festival [fig. 5.13] (Roberts:1995:29-32, fig. 35). The actions of the calf and the effect on the other participants are comparable to those of a calf in an agricultural context. Gambolling is frequently observed in young cattle, and within the herd, cows will go to or follow a calling calf. That there is not a clear distinction between these two areas of concern is exemplified by a 5th dynasty relief showing a herdsman carrying a calf on his shoulders to entice a herd of cows across a river, a commonly represented agricultural scene (Zeuner 1963a:225). The inscription above names the calf as the *Ihy of cattle* [fig. 5.14] (Roberts 1995:32, fig. 40).²⁵ The layered meaning of the image therefore relates not only to the behavioural traits of cattle but also to agricultural and religious practices and rituals.

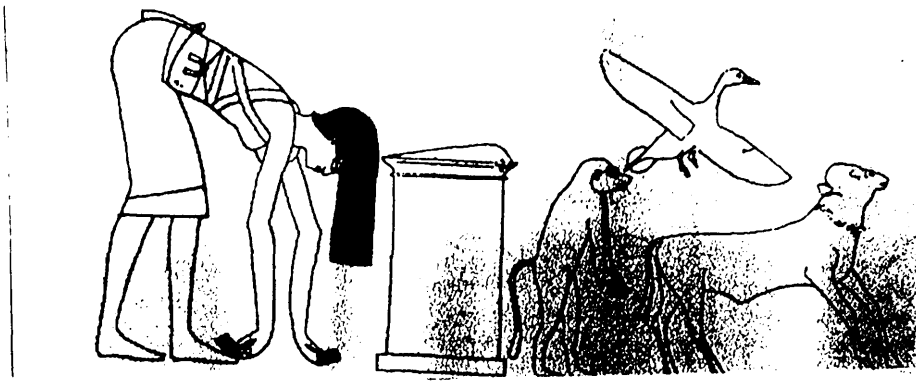


Fig. 5.13

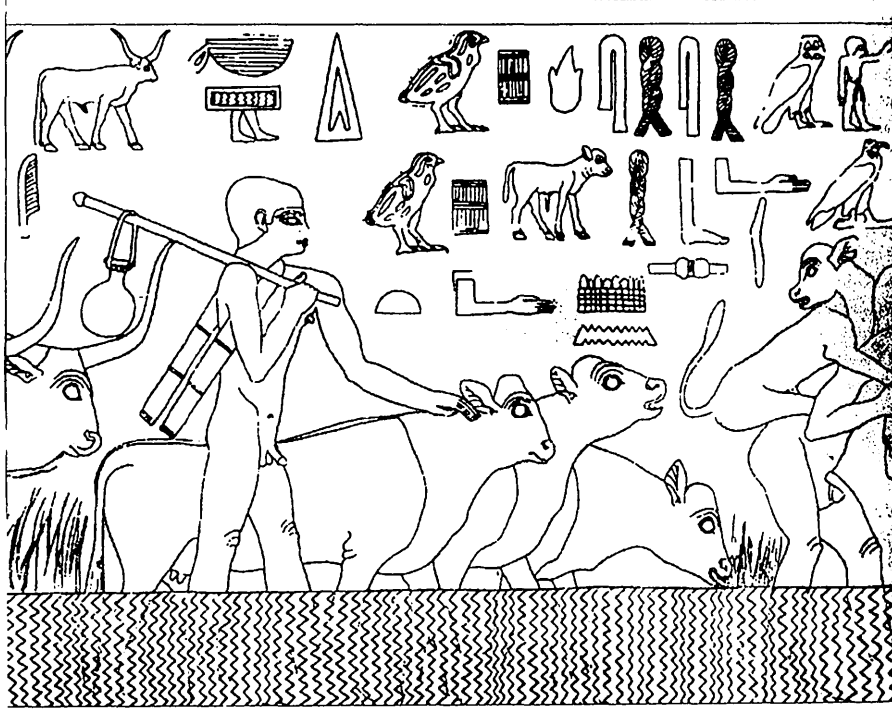


Fig. 5.14

A similarly complex image is represented in the 11th Dynasty Tomb of Baqt III at Beni Hasan [No. 168]. A cow appears to be suckling both a calf and a young boy. Houlihan (1996:210) describes this as a *light-hearted* image, intended to amuse the viewer, while Amoroso and Jewell suggest that the actions of the child are a part of the process by which the cow is conditioned to lower her milk (1963:133). In Egyptian art, the image of a cow suckling a child is further used to represent the goddess Hathor providing nourishment for the young pharaoh [Nos. 183 & 184] (Ziegler & Letellier 1977:17-8), the king being described as the son of Hathor (Hart 1986:77).²⁶ In several images from the Hathor chapel, Temple at Deir el-Bahari, Hathor is represented licking Hatshepsut, a sign of recognition and acceptance (Bleeker 1973:52; Hart 1986:78; Roberts 1995:43),²⁷ reflecting the behavioural traits of real cattle towards their young. The common theme of the cow as a source of nourishment transcends both images. If the image from tomb 15, Beni Hasan [No. 168] was intended to

be light-hearted it was not therefore because it represents an unreal practice but because of its association with or reference to royal iconography. It is also possible, and probable, considering the context of the image, that association with royal iconography was a deliberate attempt to express positive and intentional support or association.

Cows, Calves and Young Cattle: Images of Life and Death

The ...*continuum of life and death* (Morgan 1995:145) has proved an enduring aspect of mythological research (Marinatos 1993:97). Frazer saw this as embodied in the recurring mythological and ritualistic theme of the death and replacement of a sacred king (1890:213-248) while Harrison (1977) identified a clear link between these concerns and ritual practices such as rites of passage and initiation. Although it is now widely accepted that the specific theme identified by Frazer is not common to all mankind the importance of renewal in religion and myth should not be underestimated (Kirk 1970:275-7). This is emphasised in the work of Nilsson who addressed a wide range of issues surrounding man's concern with the annual cycle of death and renewal within nature (1940:5, 22-4). Similarly, Lévi-Strauss, in formalising the *structuralist* approach to myth, recognised that the concepts of life and death are inseparable opposites (1963:206-231).

This chapter has so far dealt with the cow as a source and symbol of life and nourishment. There is however evidence to suggest that cow, calf and young cattle iconography was also used to convey concerns with death and destruction.

Nos. 103, 104 and 111 show calves trying to dislodge projectiles from their backs while the two cows with young on No. 3 have been struck by projectiles. Regardless of whether these images are intended specifically to represent culling, hunting or sacrifice, they provide us with strong evidence of Minoan concerns relating to the uncertainties of new life and death. Warren interprets a sealing from Khania, showing a dagger suspended above a child [No. 189], and the evidence of child sacrifice from Knossos, as reflecting similar concerns (1986:8-9, 28, fig. 17). These images and the archaeological evidence of both human and animal infant sacrifice is yet further evidence of how Minoan concerns, expressed through imagery and ritual, encompassed both man and animals.

In chapter 3, it is suggested that the face or mask between two birds, above the back of the suckling cow on No. 7, represents a human, lion or composite face or mask and is symbolic of attack, control or power over the cow and calf. Morgan interprets the juxtapositioning of

frontal head associated with death, the flanking birds ...*perhaps another life-giving symbol* and the cow and calf in No. 7 as a combination of the elements of life and death (1995:147). Marinatos discusses the juxtapositioning of life and death images on the Ayia Triada Sarcophagus where we are presented with representations of both sacrifice/death and life, epitomised by the tree and bird (1986:27) while Morgan describes the juxtapositioning of plants (associated with growth and regeneration) and frontal heads (associated with death) as expressing the ...*continuum of life and death* (1995:145; CMS II3 289, V 254, 280 [fig. 5.15], XII 49). This echoes Dietrich's assertion that Minoan images of horns of consecration set with branches are indicative of the link between the bull, associated with death, and the growth of vegetation (1967:407; CMS II1 453, II3 45, XI 314 [fig. 5.16], XII 67, 154).²⁸



Fig. 5.15

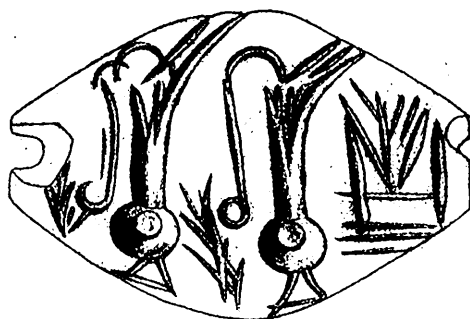


Fig. 5.16

Morgan further suggests that the pose of the cow in No. 7, as she turns down and around to lick her calf may be equated with that of the dying animal (Morgan 1995:147; cf. CMS VIII:141[fig. 5.17]). If particular animal poses were associated with death it is further possible that in No. 100 where the calf is represented in the same pose as the wounded, dying calves represented in Nos. 103, 104 and 111, the intention may have been to represent the death of the calf rather than scratching.



Fig. 5.17

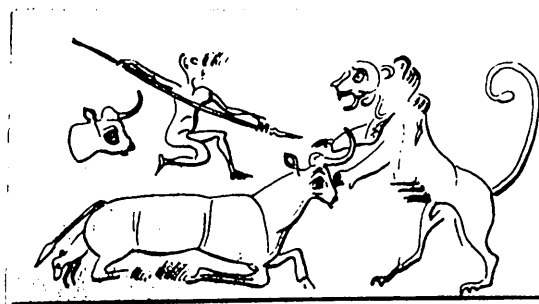


Fig. 5.18

Another possible interpretation of No. 7 is that the frontal head above the cow and calf is a symbol of protection against death or danger. A mid-third millennium BC cylinder seal from

Mesopotamia shows a cow in labour being attacked by a lion. The head of a bull in the field is interpreted as representing the sacrificial cult or the setting up of cattle skulls to protect the living animals [fig. 5.18] (Goff 1963:65-66). The *Lewiston Sun Journal* (Maine 26. 8. 99) reported the story of a farmer who, having recently lost a number of cows to unexplainable deaths, started setting up cow skulls around the farm, as his grandfather had done, in the belief that they kept away the dead. Since when he has not lost a single cow. Similar practices are attested throughout the Mediterranean (Morris 1986:pl. 223). Mellaart (1963:52) suggests that horns set in plaster bases at Çatal Hüyük were intended to protect the bed of the house, while Cole believes that they served to ward off evil spirits (1972:34). Flourentzos has suggested that a relief of a shrine topped by a bull's head or bucranium on a Bronze Age Cypriot pot may serve an apotropaic function, ...*protecting the contents of those vessels* (1993:30) while others propose a similar interpretation for two Bronze Age Cypriot terracotta models of structures topped with cattle heads (Morris 1986:283-284; Åström 1988:10). Similarly, the positioning of the bucranium pointing outwards among the stones blocking the entrance to the side chamber containing a burial at Tholos Tomb A, Phourni (LM IIIA1) (Sakellarakis & Sakellarakis 1997:164-165) might have been intended to protect or contain the occupants of the tomb.

In predynastic Egypt the heads of cattle were set up on poles to denote chieftain burials (Bleeker 1973:22) and it is possible that representations of the frontal head in Minoan iconography may also serve as a symbol associated with the power or status of an individual or group able to afford such protection and exert control.

It is possible that the image of the cow and calf on No. 7 has multiple meanings, encompassing a wide range of cattle-related concerns combining elements of both protection and exploitation, life and death. As Morgan states, *Like life and death, protection and destruction are inseparable* (1995:148). Comparable iconography comes from the Neolithic site of Çatal Hüyük where two rows of plaster breasts conceal the lower jaws of wild boars (EV I, 8) and other model breasts are set with the beaks of vultures, described as the *bird of death* (EV I, 10) (Dietrich 1967:396; Mellaart 1969:101, 106-7; Cole 1972:32, 38).

Drawing on evidence of ritualized hunting from Egypt and the Near East and the uniformity of represented weapons, Marinatos argues that there is a strong link between sacrifice and hunting (1993:131). Minoan images which add weight to this argument include CMS II7 7 [fig. 5.19] and CMS XI 330 [fig. 5.20]. CMS II7 7 shows two women, one carrying a double

axe, a weapon represented in both hunting and sacrificial contexts (cf. No. 3), and the other a sacred knot or robe while *CMS* XI 330 shows a goddess or priestess, distinguished by her robes, next to a figure-of-eight shield and a dead animal, symbols of both sacrifice and hunting. The association between the *sacred robes or skirt* and sacrificial symbols including frontal heads or bucrania have been described as indicative of the association between death and the goddess or priestess (Morgan 1995:147-8, figs. 27-33; Dietrich 1988b:13).²⁹ The figure in *CMS* XI 330 [fig. 5.20] is represented with the frontal face or mask of a lion. Morgan interprets this as further evidence of the potential association between death and the priestess or goddess (1995:148).

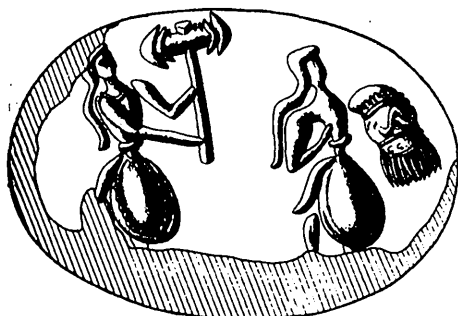


Fig. 5.19



Fig. 5.20

When we think of composite images incorporating bovine elements, those that come to mind are of bull-men or minotaurs. Such images focus on and emphasise the masculine aspects of cattle and man (*CMS* II2 29, II3 67, XI 251, XIII 84; CS 321, 322, 323, 325, 358). There are however several examples on sealings from Ayia Triada (*AT* 105 [fig. 5.21]) and Kato Zakros (*CMS* II7 145A [fig. 5.22], 145B, 146, 177 [fig. 5.23], 234 [fig. 5.24]) showing composite creatures that incorporate bovine elements but like *CMS* XI 330 [fig. 5.20], focus on female attributes. *CMS* II7 145A [fig. 5.22], 145B and 146 combine an anthropomorphic female body, prominent breasts, a bovine head and neck, wings and tail plumage. Although *CMS* 177 [fig. 5.23] is only a partial sealing, it is clear that it combines a frontal bucranium with wings and a flounced skirt, indicative of the female.

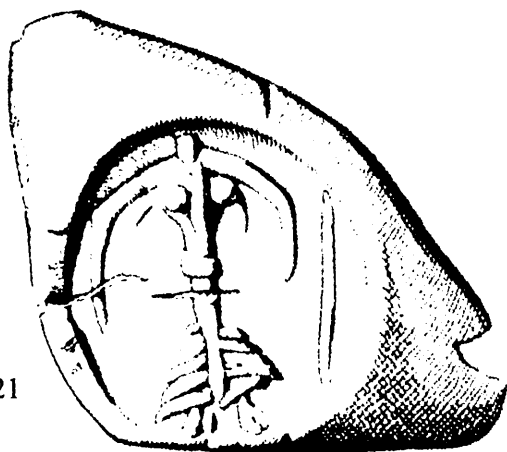


Fig. 5.21



Fig. 5.22



Fig. 5.23

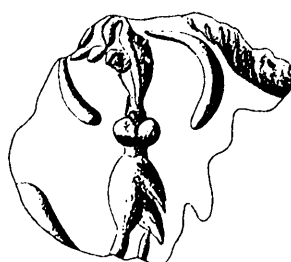


Fig. 5.24

AT 105 [fig. 5.21] is composed of a flounced skirt, indicative of the female aspect of religion and ritual and a stylized bucranium representing the torso and arms. The degree of stylization of the bucranium or bull's head is similar to that represented on *CMS* VII 45 [fig. 5.25] although in the case of fig. 5.21 a dot has been added above to indicate a head while dots to either side simultaneously represent eye sockets and breasts [cf. No. 178]. The large distinct feet look bovine rather than human.³⁰ It is possible that *CMS* II7 234 [fig. 5.24] represents a similar type of composite creature or image, consisting of a flounced skirt and horned animal head.

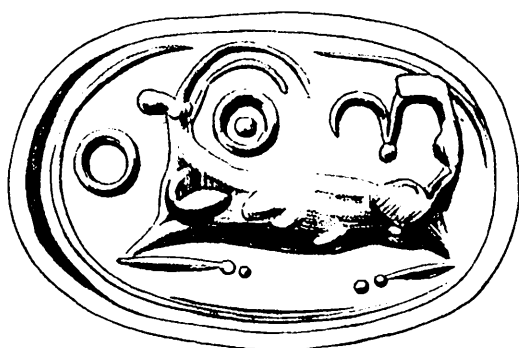


Fig. 5.25

The examples discussed above indicate that composite images and creatures were used to express concerns relating to both the male and female and that a single image could be composed of many diverse elements. The complexity of these images and range of elements appear further to represent the inseparability of the notions of sacrifice, death and nurture.

The same concerns are expressed in No. 177. The figure wears the same distinctive robes but in this case has horns on her head which have been described as the horns of sacrificial victims (Morgan 1995:137; Marinatos 1993:143) while the prominent breasts and the suggestion that the griffins to either side, one clearly open-mouthed, are reaching up to suckle, emphasizes the nurturing capacity of the female (Marinatos 1993:fig.143; Evans

1935:fig. 130). Similar concerns are probably represented in No. 178 (Evans 1935:168-169, figs. 130 & 131).

In both cases the griffins stand on base lines which Evans describes as providing a ceremonial architectural setting (1935:168-9). Reusch equates these images with the positioning of griffins painted to either side of the throne in the Throne Room, Knossos and concludes that a priestess would have occupied the seat (1958:356-7). Mellaart proposed a link between the image of the Anatolian Goddess with griffin vultures and the Cretan Goddess with vulture headed lions or griffins, suggesting that the juxtapositioning of the female and bird/griffin present us with a symbol of life and death (1963:80).

The context of the image may also affect how it is interpreted. Many examples of images representing nurture and life were found in funerary contexts. These include the clay larnakes, Nos. 2 and 3, decorated with images of cows with young. In the case of No. 3 the association between life and death is made all the more prominent by the inclusion of figures hunting the animals with young. Although it is the mothers that are being hunted, the capture or death of the mother inevitably results in the capture or death of the young. It is also noteworthy that of the eight seals and sealings from datable Minoan contexts showing cows with calves, the five seals (Nos. 9, 10, 11, 12 & 24) were all recovered from graves and tombs. Marinatos further suggests that a model from the Prepalatial tomb at Kamilari shows a woman preparing bread in a funerary context and may thus embody ideas of offering as well as serving to illustrate that *...food-producing activity for the living is a counterface to death* (1993:21, fig. 22). It has also been argued that cemeteries including Mochlos were the focus of rituals and deities concerned with the cycle of life and death, prior to the Palatial period (Branigan 1970; Goodison 1989:48). There is further strong evidence of such practices continuing into the Late Bronze Age from Phourni (Sakellarakis & Sakellarakis 1997:212-213; Marinatos 1993:28). Caves, described in later Greek mythologies as both gateways to the underworld (Euripides *Electra* 1270) and places where young gods and heroes were nurtured (discussed in Appendix D), were used during the Bronze Age for both burial and ritual (Dietrich 1967:397-400; Rutkowski & Nowicki 1996).³¹

All these examples illustrate that Minoan religion and ritual recognised the female capacity to both nourish and deprive and thus determine who or what lives and dies. The attainment of the protection or favor of such a force would therefore surely be of paramount importance. Warren has suggested that of the ten female anthropomorphic vessels he described as fertility

related goddesses, the seven found in funerary contexts probably served a protective function (Warren 1973:140-141). Arguing from the similarity of architectural elements and symbols in sacred palatial and tomb contexts, Evans concluded that large Minoan tombs ... *were at the same time shrines of the protecting Mother Goddess* (1931:23; James 1959:132). The idea that the female aspect of deity nourishes during life and protects and nourishes after death is evident in Egyptian tradition. The goddess Hathor, associated with nourishment and fertility, is also the prominent funerary goddess on the Theban necropolis (Houlihan 1996:19; Goodison 1989:88, 101; Bleeker 1973:34, 47, 51, 66-7, 85, 94-5; Hart 1986:78-79) and a ferocious defender of Ra (Heerman van Voss 1999:386; Bleeker 1973:105). Isis, sometimes in the form of a cow, escorts the pharaoh to the underworld (Hassan 1998:109). James suggests that many goddesses concerned with fertility and regeneration were also associated with death and slaughter, naming specifically Anat (*KTU* 1.3iii 5-35, 1.3iii 23-30) Asherah, Uma, Anahita and the Tamil goddess Mari Amma whose name translates as 'the destroying mother' (James 1959:74, 77, 94, 113-119). Evans similarly described the destructive chthonic aspect of the Minoan goddess, associated with earthquakes (1935:159-160; James 1959:130-1, 136-7).

Religious concerns with the dual female capacity to nurture and destroy are closely related to the actual role of female animals. In addition to serving as sources of new life and nourishment female animals, including cows, often exhibit more aggressive behavior than their male counterparts. Cows can be extremely aggressive in protecting their status within a group, territory, grazing rights and young (Haupt 1991:41, 44; Lincoln 1994:133; Bubenik 1990:16). Among the Chillingham cattle, a herd that have had little contact with man, it is the cows that exhibit most aggression, both towards other cows and bulls (Haupt 1991:40-41). Even domestic cows with young will show aggressive behavior towards herdsmen and other humans. In Cornwall Park, Auckland signs are set up every spring advising visitors not to get between cows and calves, while there are usually several cases a year in Britain where people who have come between cows and calves are injured or killed. Throughout Europe this potential is recognised by those who use and breed cows for sports including *Course Landaise* and *Course Mixte* (Spain). In Switzerland, *Combats des Reines* involves bringing together dominant cows from different herds to fight (Felix 1995:174-5, 232-3).

Conclusion

The current study has, by returning the image to its wider context, sought to provide a fuller understanding of the extensive role played by cattle in Minoan art and society. It has further

sought to understand more fully what is represented in order to explore the potential meaning of the images. Throughout this thesis, I have discussed possible interpretations of individual and groups of images. The conclusion serves therefore not to readdress specific questions relating to individual objects but rather to summarize the key points.

In Minoan art cows, calves and young cattle are represented in a range of mediums including painting and low relief, the focus of this thesis. In discussing an image it is important to consider the range and types of media in which it is represented as the object serves as a record of a decision to place a particular image in a specific context.

The quantity and range of seals and sealings bearing images of cows, calves and young cattle suggest that the image was associated with a variety of sphragistic, non-sphragistic, talismanic and decorative functions. The only certainty is that at least some were used as seals (sealings - Nos. 13, 19, 20, 98, 100, 102 & 117) while the crystal lentoid decorated with a cow and calf in a necklace from a burial near Rethymnon (Younger 1977:146) and the stone matrix from Knossos (No. 22) indicate that the image was used to decorate items that would have been worn not only for their functional value but also as prestige items, designed to be seen. Beyond this, the variety of administrative, palatial, funerary and natural contexts in which the seals have been found does not point to a specific function.

The use of the image of the cow and calf to decorate an ivory mirror handle (No. 5) and ivory and faience plaques (Nos. 1 & 4) indicates that the subject was considered suitable to adorn valuable items and possibly related specifically to the owner or the function of the object. The funerary and religious contexts in which these objects and nine of the seals (Nos. 9, 10, 11, 12, 24, 98, 100, 102 & 117) were found indicate that they were either religiously significant or at least acceptable within a religious or ritualistic context. The presence of the image of the cow and calf on larnakes (Nos. 2 & 3) reinforces this interpretation. The larnakes are however distinct in that they are not only relevant to or able to function within a funerary context but were manufactured to serve a specific funerary purpose.

Some of the images discussed include additional elements. In the case of base lines and foliage it has been suggested that these might be intended to represent particular types of architectural or rural settings. Other additional elements include linear signs, shields, projectiles, circles, birds and a face or mask. In general, we can conclude that the addition of such elements is indicative of the relationship between man and cattle. In some cases, such as

scenes of hunting and the inclusion of an architectural setting, this connection communicates easily to the modern viewer. When however the link is indicated by the inclusion of symbolic elements, the meanings of which are far from certain, it may be possible to recognize the symbolic significance of the element and image without being able to ascertain with any degree of certainty what the image as a whole means.

The intention of the author has been to explore the potential meanings of the images rather than attach them to a specific deity, ritual or belief. The wealth and diversity of evidence suggests that just as in the Near East and Egypt, where a single attribute or animal may be associated with a wide range of concerns the images of cows, calves and young cattle in Minoan art had the potential to mean and be associated with many aspects of religious and secular life.

The diversity and complexity of images and objects incorporating cows, calves and young cattle iconography suggests that the motifs have the potential to mean many things. In particular contexts the images may have had specific meanings and yet all functioned within the broader context of cattle iconography and as such would be perceived as an aspect of this fundamental category of Minoan iconography.

¹See Goodison's analysis of the relationship between images and Linear B descriptions of anthropomorphic deities (1989:103).

²Mellaart suggests that the animal figurines from Çatal Hüyük are similarly linked with concerns relating to hunting (1962:51, 57, pl. VIIb).

³Parts of the human body represented in isolation include heads (*CMS* I 420; X 145), pubic triangles (Goodison 1998:10) and legs (Talalay 1987).

⁴Schrimff (1989:79, fig. 3.4 and table 3.1) in discussing the composite beasts produced during the 1st millennium BC. by the Ilama Culture (Colombia), states that features from up to seven different species may be combined.

⁵Schrimff (1989:98) makes similar observations in relation to the representation of animals in the 1st millennium BC. Ilama Culture (Colombia).

⁶For anthropomorphic female equivalents see James 1959.

⁷The term bucrania is used by Effenterre & Effenterre (1974) to describe all cattle heads whereas some are clearly representations of the head (eyes, hair and general bulk represented) rather than the skull.

⁸The period also sees an increase in scenes of conflict between humans (Goodison 1989:106).

⁹Current religious beliefs may affect the approach to the concept of the Goddess. In the case of the study of early Israelite religion, the emphasis on monotheism as a fundamental aspect of Judaism and Christianity has been projected back. This has led to the denial or overlooking of evidence of polytheistic beliefs and practices within the early Jewish faith. There is in fact ample evidence from the bible and other literary sources that Jahweh was worshipped in conjunction with a consort (James 1959:80-81) and in turn evolved or absorbed the attributes of earlier Near Eastern gods (Van Der Toorn 1998).

¹⁰Although Mellaart discusses the broader themes of fertility and life/death (eg. 1963:79-80; 1969:104, 181), this aspect of his work is somewhat overshadowed by the 'Goddess'.

¹¹There are currently about 15,000 members of the Fellowship of Isis (Hassan 1998:100).

¹² See Marinatos (1987) for an assessment of the role of women in Minoan ritual scenes.

¹³ Goodison further makes a link between this and the pithoi burials, suggesting that the vessel is equated with the womb (1989:13).

¹⁴ Goodison (1989:fig. 242b): an 18th Dynasty (c. 1551-1490 BC). She also refers to an unpublished example dating from the 12th Dynasty (1991-1785 BC) from Karnak.

¹⁵ Ucko refers to Kenyon, K. 1956 'Jericho and its setting in Near Eastern History' *Antiquity* XXX, 186; 1957, *Digging up Jericho*, London 59-60.

¹⁶ The gods Re, Mont, Ptah and Osiris Ptah take the form of a bull (Wyatt 1999:181; Murray 1979:98-99; Viaud 1973:11-13, 29, 43-44). Actual bulls were also believed to be theriomorphic incarnations of particular gods. For example in Egypt the Apis bull was seen as an incarnation of the god Ptah while the Mnevis bull was an incarnation of Re and the Buchis bull an incarnation of Mont (Wyatt 1999:181; Murray 1979:98-99).

¹⁷ The god El is also described as 'Bull El' (Wyatt 1999:181). The Mesopotamian god Gugalanna is described as the 'Great Bull of Heaven' (Wyatt 1999:181).

¹⁸ Not included in the current study, see chapter 3.

¹⁹ Haskovec and Sullivan (1989) in discussing the rock paintings of the aboriginal artist Najombolmi describe how lactating women with prominent breasts were painted as a sign of procreation, to repopulate the land with people.

²⁰ CMS V 690 is described in the CMS as a sphinx. The head is however bird-like rather than anthropomorphic and the creature is therefore more likely to be a griffin.

²¹ The underground mortuary where the Apis Bulls' Sarcophagi were housed.

²² This scene possibly symbolises the link between a deity, fertility and prosperity. Celtic Goddesses represented with milk churns have been interpreted in the same way (Davidson 1996:93, fig. 7.3).

²³ During the Classical period honey was often offered to the chthonic gods (Simon 1983:70).

²⁴ See Buxton (1994:78-9) for the importance of agriculture in later Greek mythology.

²⁵ Roberts discusses the possibility of a link between Ihy, who leads people and animals on journeys and in dance, and the role of the Golden Calf in the Hebrew Exodus from Egypt (1995:32).

²⁶ Naville E. 1895: *The Temple of Deir el-Bahari*. In other images the goddess Hathor takes anthropomorphic form (Mariette, *Dendérah*, III 38j) sometimes possessing the face, horns or hooves of the cow. The Ugaritic texts (*The Story of King Keret*, KTU I.15ii 26-29) describe how Yasib, King Keret's son and heir, will be suckled by goddesses (Wyatt 1998:209-210, n. 150). Ivory plaques from the mid to late second millennium palace at Ras Shamra, Syria depicting gods were discovered. Among these was an image of a goddess with cattle horns suckling either divine or royal youths, possibly the goddess Athirath or Anath suckling the sons of Keret (Caquot and Sznycer 1980:318-19, pl. XXIXb).

²⁷ Naville E. 1895: *The Temple of Deir el-Bahari*, IV, pl. LXXXVII, XCIV, XCVI.

²⁸ Palmer notes that *Bucrania with plants on their head were found in the Halaf strata at Chagar Bazar* (c. 5000 BC) and it was proposed that this might be related to a perception that cattle could bring rain (1984:2). For Horns of Consecration see D'Agata 1992.

²⁹ James (1959:23) states that representations of female figures associated with double axes, bulls' heads, serpents and doves are common in Iraq from the 5th millennium onwards.

³⁰ Cf Ziegler & Letellier (1977:23, pl. 15): an Egyptian statue of a goddess, probably Hathor, represented with bovine feet and dating from the 2nd half of the 1st millennium BC.

³¹ Dowden suggests that the theme of death and renewal in the Demeter festival centres on women, both the goddess and the participants (1992:123).

Appendix A:

Animals Suckling Young

Cow and Calf

- No.1 Evans: 1921b:fig. 367, Knossos
- 2 Betancourt 1985:pl. 26f, Alatsomouri
- 3 Watrous 1991:pl. 92a, b & e, Armenoi
- 4 Sakellarakis & Sakellarakis 1997:figs. 853 & 855, Phourni
- 5 HM X 2864 (Sakellarakis & Sakellarakis 1997:figs. 854 & 856), Phourni
- 6 I 509, Crete
- 7 II3 88, Knossos
- 8 II3 288, 'Kaminaki Lasithiou'
- 9 II4 159, Gournes
- 10 II4 160, Gournes
- 11 V 298, Maleme
- 12 VS.1A 103, Khania
- 13 VS 1A 156, Khania
- 14 VII 236, Crete
- 15 VIII 85, Crete
- 16 VIII 91, Crete
- 17 XIII 28, Crete
- 18 AM 1938.1032 (CS 243), Knossos
- 19 *Betts* 13, Knossos
- 20 HMs 221 (*KSPI* R10), Knossos
- 21 AM 1938.1033, Crete
- 22 AM 1938.1087, Knossos
- 23 HM G 3309 (*CMCG* 303), Knossos
- 24 HM Σ-K 2250 (Sakellarakis & Sakellarakis 1997:fig 802 a & b) Phourni,
- 25 I 20, Mycenae
- 26 I 67, Mycenae
- 27 I 104, Mycenae
- 28 I 125, Mycenae
- 29 I 140, Mycenae
- 30 I 291, Pylos
- 31 I 364, Pylos
- 32 I 376, Pylos
- 33 I sup 28, Prosymna
- 34 I sup. 178, Pylos
- 35 V2 317, Krissa
- 36 V2 663, Megalo Kastelli, Thebes
- 37 VS IB 34, Lemnos, 6th - 5th century context
- 38 VS IB 136, Anthia
- 39 VS IB 165, Patras
- 40 VS IB: 472, Tokra, Libya, Archaic context
- 41 IX 156, Antioche
- 42 I sup 110, UO
- 43 VS IB 95, UO
- 44 IX 155, UO
- 45 IX 194, UO
- 46 IX 24D, UO

- 47 X 138, UO
- 48 X 216, UO
- 49 X 217, UO
- 50 X 255, UO
- 51 XI 60, UO
- 52 XI 188, UO
- 53 XI 293, UO
- 54 XI 332, UO
- 55 XI 344, UO
- 56 XII 306, UO
- 57 XII 14D, UO
- 58 XIII 29, UO
- 59 XIII 30, UO
- 60 XIII 133, UO

Nanny Goat and Kid ¹

- 61 Evans: 1921b:fig. 366, 367 or 369, Knossos
- 62 II3 54, Crete
- 63 VS IA 155, Crete²
- 64 VS IA 157, Crete
- 65 AM 1938.1019 (CS 316), Crete
- 66 *KSPI* L29, Crete
- 67 HMs 122 (*KSPI* N7), Crete³
- 68 HMs 295/329 (*KSPI* R46/K6), Crete⁴
- 69 Kz 163, Crete
- 70 II3 339, UO
- 71 XIII 144, UO

Lioness and Cub

- 72 II3 99, Crete
- 73 II3 344, Crete⁵
- 74 VS IB 276, Crete⁶
- 75 I 78, Mycenae
- 76 I 106, Mycenae
- 77 VS IB 141, Anthia
- 78 XII 286, UO

Deer and Fawn

- 79 XII 242, Crete
- 80 I 13, Mycenae
- 81 VII 160, UO

Bitch and Pup(s)

- 82 AM 1938.1081 (CS 208), Crete
- 83 VII 66, UO

Ewe and Lamb

- 84 AM 1938.1021 (CS 242), Crete

Sow and Piglet(s)

- 85 VS IB 60, Asine

Quadrupeds and Young

- 86 II2 237, Crete
- 87 II7 66, Kato Zakros
- 88 XII 59, Crete
- 89 HM G 3027 (C'MC'G 304), Crete⁷
- 90 VS IB 171, Kallithea, Patras
- 91 V 404, Medeon

Images of Calves

- 92 I sup 79, Crete
- 93 I sup 91, Crete
- 94 II3 13, Knossos
- 95 II3 134, Nirou Khani
- 96 II3 135, Nirou Khani
- 97 II4 5, Knossos
- 98 II4 129, Fortetsa
- 99 II4 151, Phaistos
- 100 II4 153, Ayia Triada
- 101 IV 286, Crete
- 102 V 249, Armenoi
- 103 VS IA 153, Khandia Kastelli
- 104 VS IA 154, Khandia Kastelli
- 105 VIII 66, Crete
- 106 IX 130, Crete
- 107 XII 137, Crete
- 108 AM 1938.792 (C'S 167), Candia district
- 109 AM 1938.970 (C'S 206), Mirabello
- 110 AM 1938.1027 (C'S 296), Central Crete
- 111 AM 1938.969 (C'S 301), Knossos District
- 112 AM 1938.1028 (C'S 333), Rethymnon
- 113 AM AE 690 (C'S 334), Dictaian Cave
- 114 AM 1941.92 (C'S 383), Crete
- 115 AM 1971.1136, Knossos
- 116 Popham *et al.* 1984:195 no. 12, pl. 189 D, Knossos
- 117 Sakellarakis & Sakellarakis 1997:699, fig. 805, Phourni, Archanes
- 118 I 58, Mycenae
- 119 I 72, Mycenae
- 120 I 122, Mycenae
- 121 I 189, Midea
- 122 I 215, Prosymna
- 123 I 238, Vaphio
- 124 I 287, Pylos
- 125 I 375, Pylos
- 126 V 316, Delos
- 127 V 352/353, Medeon
- 128 V 356, Medeon
- 129 V 359, Medeon
- 130 V 360/383, Medeon
- 131 V 393, Medeon
- 132 V 418, Medeon

- 133 V 673, Thebes, Kadmeion
- 134 VII 105, Mycenae⁸
- 135 XIII 12, Böotien
- 136 Evans 1935b, fig. 499, Mycenae
- 137 Frodin & Persson 1938:373-4, fig. 242,2, Asine
- 138 I sup 169, UO
- 139 VII 103, UO
- 140 VII 112, UO
- 141 VII 115, UO
- 142 VII 176, UO
- 143 VII 192, UO
- 144 VII 261, UO
- 145 VIII 130, UO
- 146 VIII 140, UO
- 147 IX 111, UO
- 148 IX 135, UO
- 149 IX 192, UO
- 150 X 249, UO
- 151 X 271, UO
- 152 X 294, UO
- 153 X 298, UO
- 154 XI 56, UO
- 155 XI 186, UO
- 156 XI 187, UO
- 157 XI 268, UO
- 158 XI 283, UO
- 159 XII 227, UO
- 160 XII 238, UO
- 161 XII 263, UO
- 162 XIII 11, UO
- 163 XIII 59, UO
- 164 AM 1938.1094 (CS 336), UO
- 165 AM 1941.135 (CS 1P), UO
- 166 AM 1971.1152, UO
- 167 AM 1980.288, UO

¹ Younger (1988:71) describes Khania 2052 as representing a nanny and kid.

² There are three spikey leaves in the field to the front of the goat.

³ The linear A sign for wheat has been scratched over the top of this sealing.

⁴ Younger (1993:fig. 66) describes KSPI R46/K6 as a cow and calf, however the shape of the heads and in particular the shortness of the tails would suggest that this is not a representation of a cow and calf but rather a nanny goat and kid.






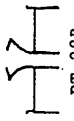
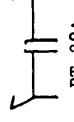
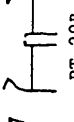
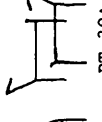
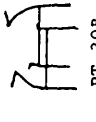
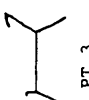
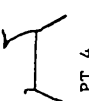
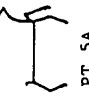
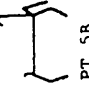
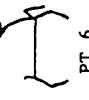


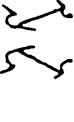


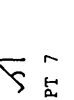
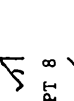
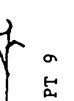
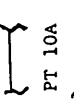
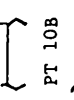

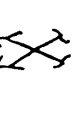
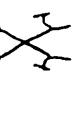
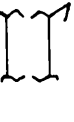


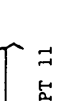
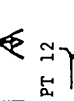
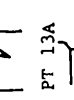
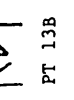
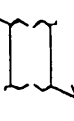
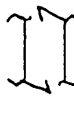
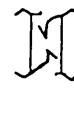


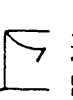
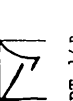
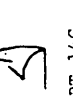
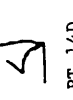
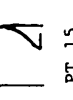
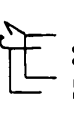
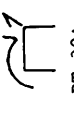

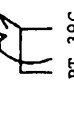
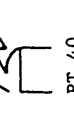
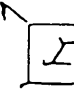

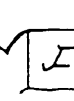





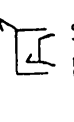
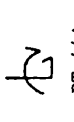

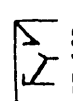
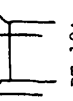
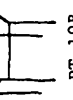
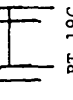
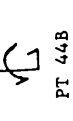
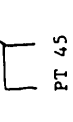
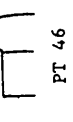
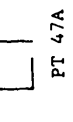
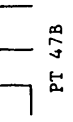




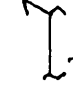



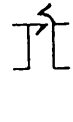



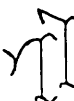
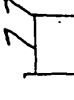
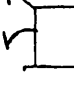

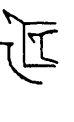

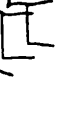







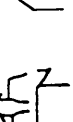


⁵ A goat's head and a figure of eight shield in the field.

⁶ Impaled triangle above the lioness.

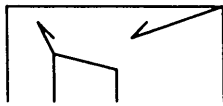
⁷ *Giam. Col.* 3027 described as a bovine with young and Younger (1988:69) as a cow and calf. The over all shape of the animal does not look like a cow. The face is damaged.

⁸ Although recorded as being Mycenaean, it is described in the preface to the CMS volume (VII:vii) as one of a group which '...show at varying stages the finest work of the Late Knossian Palace'.

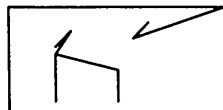
Appendix B: (1) Animal Pose Types (Younger 1988; 1993)

	PT 1A		PT 1B		PT 1C		PT 1D		PT 2		PT 28B		PT 29A		PT 29B		PT 30A		PT 30B
	PT 3		PT 4		PT 5A		PT 5B		PT 6		PT 30C		PT 31A		PT 31B		PT 32A		PT 32B
	PT 7		PT 8		PT 9		PT 10A		PT 10B		PT 32C		PT 33A		PT 33B		PT 34A		PT 34B
	PT 10C		PT 11		PT 12		PT 13A		PT 13B		PT 35		PT 36		PT 37A		PT 37B		PT 37C
	PT 14A		PT 14B		PT 14C		PT 14D		PT 15		PT 38		PT 39A		PT 39B		PT 39C		PT 40
	PT 16A		PT 16B		PT 17A		PT 17B		PT 17C		PT 41		PT 42A		PT 42B		PT 43		PT 44A
	PT 18A		PT 18B		PT 19A		PT 19B		PT 19C		PT 44B		PT 45		PT 46		PT 47A		PT 47B
	PT 19D		PT 20		PT 21		PT 22		PT 23A		PT 48A		PT 48B		PT 49A		PT 49B		PT 50A
	PT 23B		PT 23C		PT 24		PT 25A		PT 25B		PT 50B		PT 51A		PT 51C		PT 51D		PT 51E
	PT 25C		PT 26		PT 27A		PT 27B		PT 28A		PT 52A		PT 52B		PT 53		PT 54		

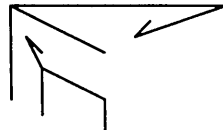
Appendix B: (2) Cow & Calf Pose Types



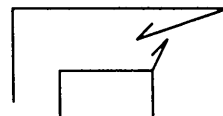
A1: The same basic pose type as that described by Younger (1988:2 [PT 18B]). The tails however have not been indicated as the position of the tail, in particular, of the young varies greatly and will be discussed in the text.



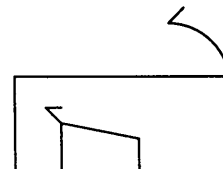
A2: The same basic pose type as that described by Younger (1988:2 [PT 18B]). Similar to A1 except the head of the calf is turned around to the mother's belly or head.



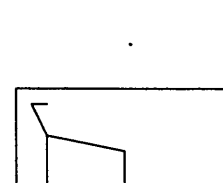
B: Similar to A except the front back leg of the mother is raised over the back of the young.



C: Younger (1988:70-72) includes this in PT 18B. Although the pose of the mother remains the same as A the young is now facing forward, clearly not suckling.



D: The mother is regardant. Similar to Younger (1988:1) PT 17A without the tails indicated.



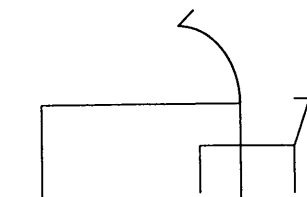
E: The mother stands facing forward, as in Younger (1988:1) PT 16A, young suckling.



F: The mother stands head back, as in Younger (1988:1) PT 1D, young suckling.



G: Similar to A except the calf is sitting.



H: The mother is regardant. Similar to Younger (1988:1) PT 17A without the tails indicated.

Appendix C: Variations between CMS and other Description of Calves and Young Cattle.

CMS Volume	CMS description	Other descriptions
I: A. Sakellariou (1965)	<i>CMS</i> 58, 72, 122, 189, 215, 238, 287 & 375, Rind(er)[Nos.118-125]*	Younger (1988) calf/calves
I Sup.: J. A. Sakellarakis (1982)	<i>CMS</i> 79 & 91 Stier(e) [Nos. 92-93] <i>CMS</i> 169c Rinderköpfe [No. 138]	Younger (1988) Animal heads...Calf, two addorsed
II 3: N. Platon & I. Pini (1984)	<i>CMS</i> 13b Tierkopf, vielleicht eines Stiers. [No. 94]	Younger (1993) Animal heads...Bull
II 4: N. Platon & I. Pini (1985)	<i>CMS</i> 134 & 135 Stier [Nos. 95 & 96] <i>CMS</i> 5 Vierfüßler (Ziege?) [No. 97] <i>CMS</i> 129 Tierkopfes (Stier?) [No. 98]	Younger (1988) Calf Younger (1988) two bulls Brock (1957:100) Griffon's head (?); Younger (1993) Calf head
IV: J. A. Sakellarakis & V.E.G. Kenna (1969)	<i>CMS</i> 151 junger Stiers [No. 99] <i>CMS</i> 153 Löwin [No. 100] <i>CMS</i> 286 Dog [No. 101]	Younger (1988) two bulls Younger (1988) calf Younger (1988) calf/dog
V: I. Pini (1975)	<i>CMS</i> 249 Stiere [No. 102] <i>CMS</i> 316, 352/353, 356, 359, 360/383, 393, 418 & 673 Vierfüßler [Nos. 126-133]	Younger (1988) two calves Younger (1988) calf/calves
V Sup. 1A: I Pini (1992)	<i>CMS</i> 153 Stier...Jungtier [No. 103] <i>CMS</i> 154 Vierfüßler ...wahrscheinlich um einen Stier....Jungtier [No. 104]	Younger (1988) calf Younger (1988) calf
VII: V.E.G. Kenna (1967)	<i>CMS</i> 105 Young...bull [No. 134] <i>CMS</i> 103 Two calves [No. 139] <i>CMS</i> 112 Three young bulls [No. 140] <i>CMS</i> 115b Two calves [No. 141] <i>CMS</i> 176 ox [No. 142] <i>CMS</i> 192 Bull [No. 143] <i>CMS</i> 261 young bull [No. 144] <i>CMS</i> 66 Kalb [No. 105] <i>CMS</i> 130 Ziege [No. 145] <i>CMS</i> 140 Zwei Kälber [No. 146] <i>CMS</i> 130 Deux taureaux[No. 106] <i>CMS</i> 111 Deux veaux[No. 147] <i>CMS</i> 135 un animal...(équidé?) [No. 148] <i>CMS</i> 192 taureau (?) [No. 149]	Younger (1988) calf Younger (1988) two calves Younger (1988) two calves Younger (1988) dog and cat ab vs calf Younger (1988) calf/bull Younger (1988) bull Younger (1988) calf Younger (1988) calf Younger (1988) two calves Younger (1988) calf Younger (1988) calves
IX: H. & M. Effenterre (1972)	<i>CMS</i> 111 Deux veaux[No. 147] <i>CMS</i> 135 un animal...(équidé?) [No. 148] <i>CMS</i> 192 taureau (?) [No. 149]	Younger (1988) two calves Younger (1988) calf Younger (1988) calves
X: J. H. Betts (1980)	<i>CMS</i> 249 probably bulls or calves [No. 150] <i>CMS</i> 271 calf [No. 151] <i>CMS</i> 294 Two animals (calves) [No. 152] <i>CMS</i> 298 Animal (bull or calf?) [No. 153]	Younger (1988) two dogs Younger (1988) calf Younger (1988) calf Younger (1988) calf
XI: I. Pini (1988)	<i>CMS</i> 56, 186, 187, 268 & 283 Rind(er) [Nos. 154-158]	No. 69 Younger (1988) calves No. 71 Younger (1985) calves
XII: V. E. G. Kenna (1972)	<i>CMS</i> 137 bull [No. 107] <i>CMS</i> 227 calves [No. 159] <i>CMS</i> 238 bull man [No. 160] <i>CMS</i> 263 two calves [No. 161]	Younger (1988) calf Younger (1988) calf man? Younger (1988) calves
XIII: V. E. G. Kenna & E. Thomas (1974)	<i>CMS</i> 12 Vierfüßler (Hirsch?) [No. 135] <i>CMS</i> 11 Zwei Stiere [No. 162] <i>CMS</i> 59 Ziegen[No. 163]	Younger (1988) four bulls Younger (1988) two bulls Younger (1988) two bulls

Volumes V, V Sup. 1A, V Sup. 1B and XI although listed as being by I. Pini also acknowledge the contribution of others. * No. 124 refers to face b. only.

Appendix D: Later Cretan Comparable Evidence

Just as ancient Greek deities, personifications and mythological figures such as Hades, Thanatos and Charon continued to feature in the Byzantine Christian context (Alexiou 1978:224-226), it has been suggested that there is continuity between Minoan and Archaic Greece and that it is during the Bronze Age that we see the earliest evidence of later mythology, cult and ritual (Hawkes 1968:33, 132-3; Warren 1986:8; Dietrich 1988:14, 20; Goodison 1989:116-117; Dowden 1992a:60).¹ Nilsson in particular argued that there was continuity between the supposedly mythological imagery of the Bronze Age and later Greek art and literature (1932). The decipherment of Linear B has since produced a considerable amount of supporting evidence (Ventris & Chadwick 1973:125-129, 275-312; Chadwick 1988:193).

In this appendix I will discuss two areas of particular relevance to the thesis. The first section focuses on the representation of myth in art and literature while the second addresses ritualistic and mythological continuity.

Images of Nurture

If we look at Archaic and Classical Cretan evidence it is clear that there are both literary and visual images that, like the Bronze Age images, represent the cow as a source of nourishment. These occur in Cretan coinage and literary accounts of mythologies and rituals in which cows and other animals are shown and described suckling both human and animal young. Prominent among this material is the myth surrounding the birth and rearing of Zeus. After giving birth to Zeus, Rhea had her son raised in secret to avoid him being eaten by his father, Kronos.²

It is a hopeless task, however zealously undertaken, to enumerate all the peoples who claim that Zeus was born and brought up among them.
Pausanias, 4.33.1

Pausanias (mid 2nd century AD) describes several versions of the story, mentioning both the regions of Arcadia (Pausanias, 3.38.2) and Crete (Pausanias, 5.7.6). Dating from the mid 3rd century BC., Callimachus' *Hymn 1* draws attention to the conflicting versions and concludes that while Zeus was born in Arcadia he was raised on Crete. Epimenides (6th - 5th century BC), although describing Zeus as being raised on Crete, names his two nurses as Kynosoura

and Helikê, the names of two Arcadian peaks (*Theog.* Diels 1951-2: fragment 22; Freeman 1946:31). In the majority of ancient sources, Crete is cited as the place where Zeus was born and raised. There is however some divergence of opinion as to whether the site was Mount Ida (Callimachus, *Hymn 1*; Apollonius Rhodius, *Argon.* II.1234, III.134; Epimenides *Theog.* Diels 1951-2: fragment 22) or Mount Dikte (Apollonius Rhodius, *Argon.* I.509; Apollodorus, *Bibl.* I.1.6; Hesiod, *Theog.* 481; Athenaeus, *Deipnosophistae* IX. 375F-376A; Antoninus Liberalis, *Metamorphosis* XIX).³ Apollonius Rhodius cites both while Strabo tells us that in the town of Prasus, there stands a temple to Diktaian Zeus (*Geography* 10.4.6). Roman inscriptions to Zeus have been identified in the Idaean cave (Rutkowski 1986:62) and Epimenides claims that this is where the infant Zeus was hidden by the Diktaian Kouretes (*Theog.* Diels 1951-2: fragment 22). Diodorus Siculus suggests that, while Zeus was born on Mount Dikte, he was raised on Mount Ida (V.70). These explanations, in particular the latter, possibly show attempts to reconcile the two versions of the story (Harrison 1977:2-3).⁴

Zeus is described as being placed in the care of the Nymphs⁵ and Kouretes. The Kouretes, like the Nymphs, are nature spirits concerned with the protection and growth of animals and plants (West 1965:155; Bowra 1970:189). In particular, they are described as clashing their armour to drown the noise of the child (Callimachus, *Hymn 1*; Apollodorus, *Bibl.* I.1.6). A Cretan coin dating from the time of Trajan showing the nymph Diktyнна holding the child Zeus shows fully armed Kouretes to either side of the central group (Nilsson 1940:538; Wroth 1886:3, pl. I, 9).⁶

There are several versions of how the infant Zeus was nourished. Prominent among those of Hellenistic and later authors is the goat Amalthea who suckles Zeus (Callimachus, *Hymn 1*; Diodorus Siculus, V.70). On the coinage of 4th –2nd century BC Praisos the protome of a goat is represented (Wroth 1886:pl. XVII, 10; Head 1911:476; Nilsson 1940:538, n. 13). The possibility of a link with the myth is emphasised by a particular example from Praisos where the reverse shows the protome of a goat and the obverse Zeus Diktaeus, holding an eagle (Wroth 1886:pl. XVII, 9).⁷ Other authors, including Ovid, describe Amalthea as a nymph who nourishes the babe with the milk of a goat she keeps, or with food and drink from a horn (*Fasti.* V 111-129; Nilsson 1940:537; Henig 1981:582). The horn of Amalthea is described as possessing the power to produce both food and drink (Apollodorus, *Bibl.* II.7.5). Apollodorus claimed that this version of events was derived from the writings of the 6th century BC philosopher Pherecydes. On a Hadrianic Cretan coin Amalthea as nymph is represented carrying the infant Zeus (Henig 1981:583, fig. 4; Svoronos 1893:10). In this

case there is no indication of how the child was suckled. On a coin from Cilicia (AD 138-161) however, Amalthea is represented carrying both the infant Zeus and a horn, and to the side there is a representation of a goat's head (Henig 1981:583, fig. 3). This is possibly indicative of two sources of nourishment.

There are several possible ways that the images in which the infant is suckled by a goat may be interpreted. The goat may be a theriomorphic representation of Amalthea, an earthly or divine goat called Amalthea or an earthly or divine goat kept by the nymph Amalthea (Dietrich 1967:403; Henig 1981:583). Such ambiguity is not restricted to visual representations as is illustrated by Apollodorus (*Bibl.* I.1.6) who says that Zeus was fed on the milk of Amalthea without indicating whether she was an animal or a nymph.

Ovid (*Fasti.* V 111-128) describes the horn as being that of Amalthea's goat while others assert that that it was a bull's rather than a goat's horn (Apollodorus, *Bibl.* II.7.5).⁸ The description of the horn as being that of a bull rather than a goat may be related to a 5th century BC coin from Praisos showing a cow suckling an infant which Svoronos described as a representation of Amalthea suckling Zeus (1893:8, pl. 1,16; see also Nilsson 1968:539).

Svoronos further asserts that the images of a cow suckling a calf on Classical coinage from Corcyra, Caristou, Euboea, Macedonia and Asia Minor relates to the same subject (1893:9, pl. 1,17-25; cf. Kraay & Hirmer 1966:336, pl. 143 no. 448; *The American Numismatic Society Annual Report* 1998:19 fig. 1, 1998.17.1). In many myths Zeus takes the form of an animal although the most well known, such as Europa and the bull and Leda and the swan are concerned with the sexual exploits of the adult god. Epimenides' account of the infant Zeus however records how the child took the form of a snake and transformed his nursemaids into bears to avoid detection by Kronos (*Theog.* Diels 1951-2: fragments 22 and 23). It therefore seems plausible that the infant as well as the adult Zeus was able to take taurine form. Another possible explanation of or factor contributing to the prominence of the image of the cow and calf from the 6th century onwards on the coinage of Corcyra and other Greek cities is proposed by Evans. He suggested that this is evidence of a renaissance, a conscious revival of an image which has its origins in the Bronze Age (1935b:557-8, fig. 20).

Other versions of the myth of the nourishment of Zeus include Athenaeus' account of an eagle that drew nectar from a rock for the infant Zeus (*Deipnosophistae* XI.491B). The eagle represented above Amalthea (as a goat) suckling Zeus on a 2nd century AD Achaian

coin, in addition to the general association of the eagle with Zeus, possibly relates to this specific myth. Athenaeus also recounts a further version where a sow both suckles Zeus and drowns the noise of the infant, adding that as a result of this the people of Praisos refrained from eating pork and offered sacrifices to the pig (*Deipnosophistae* XI.491B, IX.375F-376A). The myth may also be represented on 4th century BC coins from Lyttos which show the protome of a sow on one side and an eagle associated with Zeus on the other (Nilsson 1940:538, n. 13; Wroth 1886:pl. XIV, 1-5, 8, 9; Head 1911:471). Both Callimachus (*Hymn 1*) and Diodorus Siculus (V.70) say that Zeus was nurtured on a mixture of milk and honey. Bees represented on the coinage of Apteia, Elyrus, Hyrtacina and Praisos may therefore also relate to the rearing of Zeus (Wroth 1886:xxvi; Diodorus V.70; Callimachus *Hymn 1*; Antoninus Liberalis, *Metamorphosis* XIX). Antoninus Liberalis states that, when four intruders tried to steal the honey, they were attacked by bees (*Metamorphosis* XIX). This version of the myth is also represented on a 6th century BC Black Figure amphora (Crowther 1988:40; *CVA* British Museum III H pl. 32 1a and c).

The myth of the raising of Zeus is not the only Cretan myth involving animals nurturing young. From 4th century Kydonia there are images on coins of a bitch suckling a babe (Wroth 1886:pl. VII, 4, 7; Head 1911:463). The image remains prominent on the coinage of Kydonia into the Roman period (Wroth 1886:VIII.4 (Domitian), 34-36 (Augustan), 38 (Claudian)). It is thought to represent the raising by a bitch of the eponymous hero, Kydon, son of Hermes or Apollo and the nymph Akakallis (Nilsson 1940:539). The literature however provides us with another version where it was Miletos, another son of Akakallis and Apollo, who was brought up by wolves (Antoninus Liberalis, *Metamorphosis* XXX). Wroth, in adhering to the view of the supremacy of the literary account, suggests that the Kydonians adopted and combined with their own the myth of Miletos (1886:xxxiii). The image is however as valid a version as the written account and thus may represent an independent myth or indeed any variety of interconnections. This is comparable to the way the image on the coin from 5th century Praisos showing a cow suckling an infant is compelling evidence of a version of the myth where Zeus is suckled by a cow (Svoronos 1893:8, pl.1, 16). Indeed a further interpretation is proposed by Svoronos (1893:3) and Nilsson (1968:540) who argue that a thunderbolt above the back of the bitch on some of the coins from Kydonia indicates that the suckling young is in fact Zeus (Svoronos 1893: pl. 1, 4).

A further myth of an animal providing nourishment is associated with the Cretan town, Elyros (Nilsson 1940:540). In this case, Pausanias records how the Elyrians sent a bronze

statue of a goat suckling the twins Phylakides and Philandros, sons of Akakallis and Apollo to Delphi (Pausanias, X, 16, 5).

The Bronze Age Origins of the Image?

Nilsson suggested that an sealing from Bronze Age Knossos showing an infant sitting under a sheep [No. 185] is evidence that the myth of a deity or hero suckled by an animal may have originated during the Bronze Age (1940:540; Evans 1921b:fig. 373). Evans described this as a representation of *...an infant god nourished* (1930: 466-467) and more specifically stated that the sheep is serving the same function as the goat Amaltheia (1921b:515). In the same vein, Dietrich claimed that the goat⁹ takes the place of the goddess, reflecting the *...ambivalence between the anthropomorphic goddess and her animals* (1967:403). A further sealing from Knossos which shows a goat in a rocky setting was described by Dietrich as a representation of the goat taking the place of the Minoan goddess in the cave (1967:403; Matz 1956: pl. 54). He further observed that Cretan caves, the usual settings for the later myths also served as centres for ritual activity as early as the Bronze Age (Dietrich 1974:108-9, 110, 117; 1988:16), archaeological material providing evidence of ritual activity associated with specific caves on Crete from as early as the MM period (Rutkowski 1986; Rutkowski & Nowicki 1996). Both Homer (*Od.* XIX 188) and Strabo (*Geography* 10.4.8) state that in addition to her temple at the seaport of Amnisos, Eileithuia, the goddess of childbirth was also worshipped in a cave. Warren says that the Minoan nature or fertility goddess and mistress of the animals *...continued essentially into Greek religion as Artemis Eileithyia and Kourotraphos* (1973:143-4; Nilsson 503-9). The Linear B tablets do indeed provide us with evidence that Eileithyia was worshipped at Amnisos already during the Bronze Age (Kn Gg 705; Schoep 1994:8; Rutkowski & Nowicki 1996:82).

It is similarly suggested that the Kouretes and Hellenic Zeus evolve from Pre-Hellenic divinities connected with nature and the annual cycle (West 1965:85). Indeed, Diktaian Zeus is referred to on the Linear B tablets from Knossos (KN Fp1.2). Bowra suggests that it is only on Crete that these early aspects of the god remained of central importance in later myth and ritual (1970:188, 196). This aspect of the Kouretes is also emphasised in the Cretan context where, it was thought, they instigated the domestication of animals (Diodorus Siculus, 5.65.1-2). As Bowra asserts, *They are not merely suitable companions of the young Zeus, they are intimately connected with the kouros* (1970:189).

In discussing the literary evidence, Dietrich argues that, although the bulk of it dates from the Hellenistic period, this does not diminish its value as possible evidence of continuity from earlier periods, as these authors ...*quote from ancient religious stock which had survived to their day* (1967:401). Many scholars have convincingly interpreted the stele from Palaioikastro bearing *The Hymn of Zeus*, commemorating the birth of the god, as an example of this type of literary tradition. Although the stele dates from the 2nd-3rd centuries AD the actual poem may date from as early as the 4th – 5th centuries BC (Bowra 1970:182). Others believe that the origins of the hymn and myth are to be found in the Bronze Age (Harrison 1963:2; West 1965:154-5; Nilsson 1968:540; Bowra 1970).

Orphic Rituals

In discussing the children's bones bearing butcher's marks found at a Minoan house, Knossos, Warren proposes that they may represent evidence of ritualistic child sacrifice and consumption of the flesh (1981).¹⁰ He further draws on the evidence of later Greek rituals and myths involving the sacrifice and consumption of the raw flesh of both humans and animals, associated in particular with the cult of Dionysus (Warren 1981:161; Euripides, *Kretes fragment 79*¹¹, *Bacchae*; Antoninus Liberalis, *Metamorphosis* X¹²; Plutarch *Quaest. Graec.* 38; Clement of Alexandria, *Protr.* III 36; Porphyry *de abst.* II.55.13-16¹³; Frazer 1890:327-329; Harrison 1977:118-119). It is further suggested that the lack of a prominent Dionysian presence on Crete can be accounted for by the fact that this type of ritual was already well established on Crete, long before Dionysus gained prominence (Diodorus Siculus, V 77) and was instead associated with Zeus Kretagenes (Clement of Alexandria, *Protr.* III 36; Nilsson 1968:579; Willetts 1962:200-220; Warren 1981:161-2). As stated above, the name Diktaean Zeus is indeed recorded in the Linear B tablets and possibly has its origin in Linear A (Schoep 1994:8).

It is further asserted that the theme of the divine infant, secretly raised by the Kouretes, threatened, killed, consumed and reborn¹⁴ was ...*told variously about Zagreus, Dionysus and Zeus* (Harrison 1977:15-16; Diodorus Siculus, V 75 4; Nonnus, *Dion.* 6 155-205, 10 292-9, 27 228-9).¹⁵ Zagreus is also specifically identified with Dionysus (Callimachus, *fragment 171*¹⁶; Aeschylus, *fragment 228*; Nonnos, *Dion.* 5 563-67, 6.206-10; Euripides, *Kretes fragment 79*¹⁷; Kerényi 1982:114,250; Gantz 1993:118-119). This complex coalescence is exemplified by the myths surrounding the parenthood of Dionysus and Zagreus. In some myths Zeus is the father of both Dionysus and Zagreus while in others Dionysus is described as the son of Hades. Persephone's husband and the father of Dionysus is however also

referred to as Zeus Katachthonios 'subterranean Zeus' and Zagreus, 'the great hunter' (Kerényi 1982:114), suggesting that Hades was ...*only one aspect of...a great god* (Kerényi 1982:250). Harrison comments that in *The Hymn to Zeus*, the title *Kouros* is assumed to refer to the infant Zeus but elsewhere refers to both Zagreus and Dionysus (1977:14). In later texts Zagreus is linked with Cretan ritual and Warren further suggests that this non-Greek name was originally Minoan (1981:161) while Guthrie describes Zagreus as the Bronze Age name for Zeus, Hellenised into another, distinct name and by the 5th century synonymous with Bacchus and Dionysus (1952:112-13). The evidence therefore strongly supports Warren's assertion that Zagreus ...*was considered equivalent to Dionysus and to Cretan Zeus* (1981:161; Willetts 1962:221; Kerényi 1982:114,250). He further concludes ...*that behind the myth of Zagreus might lie a tradition of the sacrifice and eating of children* and that the evidence of such ritual practice from Bronze Age Crete may be related to the later evidence (1981:163).

If we consider the evidence as a whole, it is clear that during the Iron Age and subsequent periods, cult activity centring on the myth of the infant god hidden, suckled, killed, devoured and reborn, included rituals involving both human and animal sacrifice (Aelian, *Var. Hist.* II 42; Pausanias 9.8.2; Frazer 1890:329; Antoninus Liberalis, *Metamorphosis* X¹⁸). In one specific account of ritual practise on the island of Tenedos, a cow which had just given birth was afforded the care usually reserved for women while the calf was clothed in bushkins and sacrificed (Aelian, *Nat. An.* XII 34; Frazer 1890:329). This no doubt reflects either the actual or symbolic replacement of a human victim with an animal or the coalescence of anthropomorphic and zoomorphic elements within myth and cult. From the Sub Minoan – Early Protogeometric burial X at Vronta, Crete the animal bones, interpreted as representing sacrifice, found in a pit beneath the burial include those of both adult dogs and puppies (Coulson, Day & Gesell 1981:408).

If, as Warren suggests, there is continuation between Bronze Age and later ritual, practices and mythological themes, it is likely that the Bronze Age iconography, addressing human and animal birth and nurture and the murder/sacrifice of the young may also be linked to this general theme and specifically later representations and that the Cretan claim to have the longest tradition of mystery or orphic rituals was more than a groundless boast (Diodorus Siculus, V 77).

Conclusion

It is all too easy to fall into the trap of projecting later Greek evidence onto prehistoric remains; equating representational similarities with common meaning. Even Evans and Nilsson who argued in favour of there being continuity, admitted that the image of animals suckling young is common to many cultures and therefore not necessarily indicative of common meaning or continuity (Evans 1930:466; Nilsson 1968:540). Whether this evidence is indicative of continuity in practice and belief is far from certain but the variety and range of evidence, covering representation, mythology, cult and ritual is compelling and strongly suggests that Hellenic Cretan myth and ritual retained, adopted or incorporated elements which have their origins in the Bronze Age.

¹ Hassan (1998:101) makes a comparable argument in her suggestion that it is necessary to look at the Predynastic, preliterate evidence from Egypt in order to understand the origins of the goddess in Egypt.

² For a full account of the background to the myth see Gantz (1993:41-42).

³ For Antoninus Liberalis, *Metamorphosis* see Celoria (1992).

⁴ The names given to places in ancient literature were not always accurate. Crowther (1988:42) has suggested that the ancient accounts of the peak of Dikte on which Zeus was born may in fact refer to the modern day hill of Petsophas. See also Rutkowski and Nowicki (1996:81).

⁵ In addition to Amalthea (discussed below) the nymphs listed as rearing the infant Zeus include: Callimachus *Hymn to Zeus*: Neda, Meliae and Adrasteia; Apollodorus I.1.6: Adrasteia and Ida; Pausanias IV.33.1: Ithone and Ida.

⁶ See Henig 1981:582-3, figs. 2 & 6: Roman representations of Amalthea nursing Zeus accompanied by the Kouretes.

⁷ See Henig 1981:582-3, figs. 6, 7, 11, 12: Non Cretan representations of Amalthea as a goat suckling Zeus.

⁸ Apollodorus' version is probably based on that of Pherecydes, a 6th century BC philosopher.

⁹ Dietrich (1967:403) describes the animal as a goat rather than a sheep. The horn shape appears however to indicate that this is a sheep.

¹⁰ For discussion of the evidence of human sacrifice during the Bronze Age on Crete see Sakellarakis & Sakellarakis (1997:301-311)

¹¹ See C. Austin (ed) 1968 *Nova Fragmenta Euripidea*, fragment 79.

¹² For Antoninus Liberalis, *Metamorphosis* see Celoria (1992).

¹³ See *Philosophi Platonici Opuscula Selecta*, Teubner series (1963).

¹⁴ Although the infant Zeus is not consumed, this is still a major element of the myth as it is Kronos' consumption of her other children that causes Rhea to hide Zeus.

¹⁵ The scene is also represented on a red figure hydria from Kameiros (Smith, C. 1890, *JHS* 11, 343-51; British Museum E. 818).

¹⁶ See Schneider, 1873, *Callimachea*, 431-2.

¹⁷ See C. Austin (ed) 1968 *Nova Fragmenta Euripidea*, fragment 79.

¹⁸ For Antoninus Liberalis, *Metamorphosis* see Celoria (1992).

Appendix E: Representations of Cattle, Cattle Heads, Bucrania, and Bovine/people in Cretan Glyptic

The following is a list of Cretan seals and sealings decorated with images of cattle, bovine heads, bucrania and bovine/people. They are 'Cretan' in the sense that they were found on Crete and therefore functioned within the Cretan context. Although the vast majority were no doubt manufactured on Crete, a few exhibit stylistic features that indicate that they were produced elsewhere.

The List Entries

The individual entries conform to the following format:

Publication museum/collection description	provenience seal/sealing (shape)	date
---	-------------------------------------	------

Abbreviations

The following abbreviations will be used in addition to those used throughout the thesis and listed in the main list of abbreviations:

Abbreviated shapes

A	Amygdaloid
D	Disk
L	Lentoid
Pr	Prism
R	Rectangular Plate
St	Stamp

Iconographical Abbreviations and Terminology

(fill)	secondary/filling motif
bovine	cattle of indeterminate sex
bovine (m)	male: testicles and/or iliac crest represented
bucranium	bovine skull
bovine head	bovine head (indication of flesh, hair, ears and/or eyes)
*	discussed or referred to in text
.../...	either or composite image consisting of both
?	50% < 100% certainty (the list does not include examples that the author is less than 50% certain represent bovines, bovine heads, bucrania or bull-people).

CMS I

I 418 NMA 4585 bovine head / bucranium	Crete Seal (Pr)	EM
I 437 NMA 4662 bovine head/ bucranium	Crete Seal (Pr)	NPP
I 492 NMA 4609 bovine	Crete Seal (L)	NPP
I 493 NMA 4635 bovine	Crete Seal (L)	NPP
I 494 NMA 4636 bovine	Crete Seal (L)	NPP
I 495 NMA 4592 bovine	Crete Seal (L)	NPP
I 496 NMA 4663 bovine	Crete Seal (R)	NPP
I 509* NMA 4596 cow & calf	Crete Seal (L)	NPP
I 515 NMA 5404a two bovines	Crete (Knossos?) Sealing	NPP
I 517 NMA 5404b bovine & man	Crete (Knossos?) Sealing	NPP
I sup. 77* NMA 9981 bovine	Crete Seal (A)	

I sup. 78 NMA 9988 two bovines	Crete Seal (L)
I sup. 79* NMA 10111 young bovine	Crete Seal (L)
I sup. 91* NMA 10116 two young bovines	Crete Seal (L)
I sup. 100* NMA 10108 bovine	Crete Seal (L)

CMS II 1

II 1 145 HM 528 two bovine heads/ bucrania	Koumassa Seal (Pr)	EM II-MM II
II 1 183 HM 1930 bovine	Lenda Seal (St)	EM II-MM IA
II 1 237* HM 1216	Marathokephalo Seal (calf shaped)	EM II-MM IB
II 1 253* HM 1044	Platanos Seal (calf shaped)	EM II-MM II
II 1 336 HM 1129 bovine head/ bucranium (fill)	Platanos Seal (St)	EM IA-MM II
II 1 419* HM 1302 bovine & lion	Mallia Seal (St)	MM I-II (?)
II 1 422 HM 1699	Maronia Sitias Seal (calf head shaped)	EM II-III

CMS II 2

II 2 29* HM 238 bovines & bull-man	Knossos Seal (cylinder) (NW Mesopotamia/ SE Anatolia origin)	OPP
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II 2 36* HM 1329 bovine head	Knossos Seal (D)	MM IIB
II 2 60* HM 1719 bovine (m)	Knossos Seal (L)	MM
II 2 77 HM 1303 bovine (m)	Mallia Seal (St)	EM-MM
II 2 78 HM 1304 bovine head	Mallia Seal (Pr)	EM-MM
II 2 82 HM 1550 bovine head/ bucranium	Mallia Seal (Pr)	OPP
II 2 111* HM 1781 bovine head	Mallia Seal (Pr)	MM I-II
II 2 114 HM 1784 bovine head/ bucranium	Mallia Seal (Pr)	MM I-II/IIB
II 2 120* HM 1790 bovine head/ bucranium	Mallia Seal (Pr)	MM I-II
II 2 138 HM 1810 bovine head	Mallia Seal (Pr)	MM I-II
II 2 144 HM 1816	Mallia Seal (Pr)	MM I-II
II 2 150 HM 1822 bovine head/ bucranium	Mallia Seal (Pr)	MM I-II
II 2 190* HM 2292 bovine head/ bucranium	Mallia Seal (Pr)	MM I-II

II 2 191 HM 2462 bovine head/ bucranium	Mallia Seal (Pr)	MM I-II
II 2 211* HM 1579 bovine head	Knossos Seal (D)	OPP
II 2 218 HM 644 bovine head/ bucranium	Potamies Seal (Pr)	OPP
II 2 251 HM 764 human face with horns	Mokhlos Seal (St)	OPP
II 2 262 HM 567 bovine head/ bucranium	Palaikastro Seal (Pr)	OPP
II 2 265* HM 1944 bovine head/ bucranium	Milatos Seal (Pr)	OPP
II 2 277 HM 1688 bovine head/ bucranium	Lithines Seal (Pr)	OPP
II 2 283 HM 591 bovine head	Kato Zakros (?) Seal (D)	OPP
II 2 296 HM 115 bovine head/ bucranium	Crete Seal (Pr)	OPP
II 2 333 HM 1277 bovine head/ bucranium	Crete Seal (St)	OPP
<u>CMS II 3</u>		
II 3 5 HM 1463 bovine head/ bucranium (fill)	Axos Seal (L)	NPP

II 3 9 HM 901 bovine, man & dog or lion	Knossos Seal (L)	NPP
II 3 11* HM 337 bovine head	Knossos Seal (R)	LM II
II 3 13* HM 1419 calf head	Knossos Seal (L)	MM III-LM I
II 3 20* HM 1283 bovine	Knossos Seal (L)	LM IB
II 3 44* HM 687 bovine (m) & lion	Knossos Seal (L)	LM III B1
II 3 60* HM 1712 bovine & lion	Knossos Seal (L)	LM IB-III A
II 3 62 HM 1656 two bovines	Knossos Seal (L)	LM II
II 3 64 Iraklion (1658) bovine	Knossos Seal (Pr)	LM II
II 3 67* HM 1865 bull-man	Knossos Seal (L)	LM III A2-B
II 3 68 HM 1864 bovine	Knossos Seal (R)	LM III A2-B
II 3 69 HM 1866 bovine (m)	Knossos Seal (R)	LM III A2-B

II 3 88* HM 206 cow & calf	Knossos Seal (L)	NPP
II 3 89* HM 202 bovine	Knossos Seal (L)	NPP
II 3 96 HM 1594 bovine head	Knossos Seal (Pr)	NPP
II 3 101* HM 167 bovine	Kalyvia Seal (L)	LM III A1-2
II 3 102 HM 170 two bovines	Kalyvia Seal (L)	LM III A1-2
II 3 105* HM 169 bovine & man	Kalyvia Seal (R)	LM III A1-2
II 3 106 HM 173 two bovines	Kalyvia Seal (L)	LM III A1-2
II 3 119 HM 1417 two bovines	Ayia Triada Seal (L)	LM III A1
II 3 129* HM 1598 bovine & lion	Katsambas (Iraklion) Seal (L)	LM III A1
II 3 134* HM 1306 calf	Nirou Khani, Seal (L)	LM IIIB
II 3 135* HM 1307 α calf	Nirou Khani, Seal (L)	LM IIIB
II 3 149* HM 1548 bovine head	Mallia Seal (L)	NPP

II 3 173* HM 124 bovine & lion	Knossos Seal (L)	NPP
II 3 174* HM 1653 bovine	Knossos Seal (L)	NPP
II 3 196 HM 1193 bovine head	Anopolis Seal (L)	LM I-II
II 3 202 HM 609 bovine	Evangelismos Seal (L)	LM II
II 3 212* HM 954 bovine	Gouves Seal (L)	MM III- 2nd transitional phase
II 3 214* HM 1505 bovine	Khersonisos Seal (R)	NPP
II 3 216 HM 94 bovine	Mallia Seal (L)	LM II
II 3 224 HM 158 bovine	Diktaian Cave Seal (L)	MM II-LM III
II 3 225 HM 159 bovine	Diktaian Cave Seal (L)	MM II-LM III
II 3 226* HM 160 bovine	Diktaian Cave Seal (L)	MM II-LM III
II 3 231 HM 195 two bovine heads/ bucrania	Gournia Seal (Pr)	LM I-IIIB
II 3 238 HM 396 bovine (m)	Gournia Seal (R)	MM III

II 3 271 HM 185 bovine & man	Praisos Seal (L)	LM II
II 3 288* HM 947 cow & calf	Kaminaki Lasithiou Seal (L)	LM
II 3 289 HM 1501 bovine head/ bucranium	Psykhro Seal (A)	LM
II 3 293 HM 1438 bovine	Limnes Seal (L)	
II 3 309 HM 1479 bovine	Siteia Seal (A)	
II 3 310 HM 131 two bovines	Siteia Seal (L)	
<u>CMS II 4</u>		
II 4 5* HM 692 two calves	Knossos Seal (L)	NPP
II 4 36 HM 382 two bovines	Knossos Seal (L)	LM
II 4 56 HM 1196 bovine	Pediada Seal (L)	LM
II 4 105 HM 917 bovine (m)	Tylissos Seal (L)	
II 4 126 HM 1314 bovine	Knossos Seal (L)	

II 4 129 HM 1660 calf head	Fortetsa Seal (L)	
II 4 132* HM 228 bovine	Knossos Seal (L)	
II 4 141 HM 2043 bovine	Knossos Seal (L)	
II 4 142* HM 1412 bovine	Knossos Seal (L)	
II 4 151* HM 182 two calves	Phaistos Seal (L)	
II 4 153* HM 2050 calf	Ayia Triada Seal (A)	
II 4 157 HM 1232 bovine & man	Gournia Seal (L)	
II 4 158 HM 1233 two bovines (one head)	Gournia Seal (L)	LM III
II 4 159* HM 1248 cow & calf	Gournia Seal (L)	LM III B1
II 4 160* HM 1249 cow & calf	Gournia Seal (L)	LM III B1
II 4 161 HM 1247 bovine & bird or fish	Gournia Seal (L)	
II 4 162 HM 1398 bovine & man	Mallia Seal (L)	

II 4 172 HM 966 bovine	Trypiti Seal (L)
II 4 199 HM 1495 bovine	Khersonisos Seal (L)
II 4 203 HM 156 two bovines (?)	Diktaian Cave Seal (L)

CMS II 5

II 5 266* HM 700 bovine (m)	Phaistos Sealing	MM IB-IIA
II 5 267 HM 915 cow	Phaistos Sealing	MM IB-IIA
II 5 268* HM 695, 695ι'Β, 695νβ'Β bovine (m)	Phaistos Sealing	MM IB-IIA
II 5 269 HM 695α'Α, 695ζ'Α, 695θ'Α, 695λζ'Α, 695μη'Α, 695 λθ'Α, 924 (?) bovine (m)	Phaistos Sealing	MM IB-IIA
II 5 288* HM 701 calf (?)	Phaistos Sealing	MM IB-IIA
II 5 293 HM 1063 bovine	Phaistos Sealing	MM IB-IIA

CMS II 7

II 7 28 HMs 85 bovine	Kato Zakros Sealing	LM IA-IB
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II 7 29 HMs 56/1,2. 73/1,2 bovine (m)	Kato Zakros Sealings	LM IA-IB
II 7 31*	Kato Zakros	LM IA-IB
HMs 35/1, 3, 95/1-5 bovine (m) & lion	Sealings	
II 7 32 HMs 1139 bovine & man	Kato Zakros Sealing	LM IA-IB
II 7 34 HMs 59 bovine & man	Kato Zakros Sealing	LM IA-IB
II 7 35 HMs 1131 bovine & two men	Kato Zakros Sealing	LM IA-IB
II 7 36 & Betts 1967 HMs 12 (Kato Zakro) HMs 625 (Sklavokambos) bovine & man	Kato Zakros & Sklavokambos Sealings	LM IA-IB
II 7 37 HMs 17/1, 4, 5, 12, 18-20, 27, 29, 31, 33. 37/1, 2 bovine (m) & man	Kato Zakros Sealings	LM IA-IB
II 7 38 HMs 17/2, 3, 6-11, 13-17, 21-26, 34. 1160 bovine (m) & man	Kato Zakros Sealings	LM IA-IB
II 7 39 HMs 1051 bovine (m) & man	Kato Zakros Sealing	LM IA-IB
II 7 40 HMs 41 bovine	Kato Zakros Sealing	LM IA-IB
II 7 41 HMs 1147/ 1-5 bovine (m)	Kato Zakros Sealings	LM IA-IB

II 7 42 HMs 1118 bovine	Kato Zakros Sealing	LM IA-IB
II 7 44 HMs 1119 bovine (m)	Kato Zakros Sealing	LM IA-IB
II 7 46 HMs 49 bovine	Kato Zakros Sealing	LM IA-IB
II 7 49 HMs 74 bovine	Kato Zakros Sealing	LM IA-IB
II 7 50 HMs 47/1-3 bovine (m)	Kato Zakros Sealings	LM IA-IB
II 7 51 HMs 65/2, 4 bovine	Kato Zakros Sealings	LM IA-IB
II 7 52* HMs 78/ 1, 2 bovine & bovine (?)	Kato Zakros Sealings	LM IA-IB
II 7 53 HMs 1179 bovine (m)	Kato Zakros Sealing	LM IA-IB
II 7 54 HMs 1156/ 1, 2 bovine	Kato Zakros Sealings	LM IA-IB
II 7 101* HMs 20/1-4 bovine (m) & lion	Kato Zakros Sealings	LM IA-IB
II 7 102* HMs 1110/1-3 bovine & lion	Kato Zakros Sealings	LM IA-IB

II 7 145A HMs 5/4-7 AM AE 1199b composite creature incorporating bovine head (f)	Kato Zakros Sealings	LM IA-IB
II 7 145B HMs 5/1-3 composite creature incorporating bovine head (f)	Kato Zakros Sealings	LM IA-IB
II 7 146 HMs 5/8 composite creature incorporating bovine head (f)	Kato Zakros Sealing	LM IA-IB
II 7 155 HMs 1/1, 2, 4-6, 10-12 AM AE 1199a composite creature/image incorporating bucranium	Kato Zakros Sealings	LM IA-IB
II 7 156 HMs 1/3, 7-9, 13 composite creature/image incorporating bucranium	Kato Zakros Sealings	LM IA-IB
II 7 172 HMs 1122 bovine head	Kato Zakros Sealing	LM IA-IB
II 7 173 HMs 84 bovine head	Kato Zakros Sealing	LM IA-IB
II 7 177 HMs 37/2 composite creature/image incorporating bovine head (f?)	Kato Zakros Sealing	LM IA-IB
II 7 178 HMs 24/1, 2 composite image incorporating bovine head	Kato Zakros Sealings	LM IA-IB
II 7 179 HMs 23/1-3 composite image incorporating bovine head/ bucranium	Kato Zakros Sealings	LM IA-IB
II 7 180 HMs 46 composite image incorporating bovine head/ bucranium	Kato Zakros Sealings	LM IA-IB

II 7 181 HMs 6/1-4 AM AE 1199g composite image incorporating bovine head/ bucranium	Kato Zakros Sealings	LM IA-IB
II 7 182* HMs 24/1, 2 composite image incorporating bovine head	Kato Zakros Sealings	LM IA-IB
II 7 183 HMs 15/9(?), 10, 15(?), 18, 25(?), 27 composite image incorporating bovine head/ bucranium	Kato Zakros Sealings	LM IA-IB
II 7 184 HMs 15/1-5, 7, 8, 9(?), 11-14, 15(?), 16, 17, 19-24, 25(?), 26 AM AE 1199γ, AE 1199n (CS 27S), AE 1199y composite image incorporating bovine head/ bucranium	Kato Zakros Sealings	LM IA-IB
II 7 185 HMs 15/6, 9(?), 15(?), 25(?) composite image incorporating bovine head/ bucranium	Kato Zakros Sealing	LM IA-IB
II 7 234 HMs 1137 composite creature/image incorporating bovine head (f?)	Kato Zakros Sealing	LM IA-IB

CMS IV

IV 124 HM M 466 bovine head/ bucranium	Aski Seal (Pr)	MM IB-II
IV 168* HM M 266 bovine head	Knossos Seal (L)	
IV 224* HM M 222 two bovine heads	Mesara Seal (A)	LM IB
IV 225 HM M 197 bovine	Mesara Seal (A)	LM IB

IV 226 HM M 258 bovine head	Siteia Seal (A)	LM IB
IV 236 HM M 279 bovine head/bucranium	Aimonas Seal (A)	LM IB
IV 256 HM M 1030 two bovines	Elounda Seal (L)	LM II
IV 259 HM M 1338 bovine & lion	Tsoutsouros Seal (L)	LM II
IV 267 HM M 251 bovine	Asimi Seal (L)	LM III A1
IV 268* HM M 307 bovine	Siteia Seal (L)	LM III A1
IV 272* HM M 1240 bovine	Knossos Seal (L)	LM III A
IV 278* HM M 503 bovine	Kapetaniana Seal (L)	LM III A2
IV 280 HM M 302 bovine	Lastros Seal (L)	LM III A2
IV 281 HM M 320 bovine	Aphrati Seal (L)	LM III A2
IV 300 HM M 1349 bovine	Khoumeri Seal (L)	LM III B
IV 305 HM M 291 bovine	Knossos Seal (L)	LM III B

IV 14D
HM M 1118
bovine head/ bucranium

Mallia
Seal (Pr)

IV 36D
HM M 1096
bovine

Keramoutsi
Seal (L)

CMS V

V 28
Ayios Nikolaos Museum 277
two bovine heads/ bucrania

Crete
Seal (D)

V 240
Khania Museum 2053
two bovines

Khania
Seal (L)

V 247*
Khania Museum
bovine

Armeni
Seal (L)

LM IIIA-B

V 249
Khania Museum
two calves

Armeni
Seal (L)

LM III B1

V 252*
Khania Museum
bovine & bovine head/ bucranium

Armeni
Seal (L)

LM III A

V 254*
Khania Museum
bovine (?)

Armeni
Seal (L)

LM III A

V 265*
Khania Museum
bovine & lion

Armeni
Seal (L)

LM III B

V 267
Khania Museum
bovine

Armeni
Seal (ring)

LM III B

V 280*
Khania Museum
bovine

Armeni
Seal (L)

LM III A-B

V 298* Khania Museum 2054 cow & calf	Maleme Seal (R)	LM III B
<u>CMS VS. 1A</u>		
VS. 1A 40* Ayios Nikolaos Museum 11873 bovine head/ bucranium	Ayios Kharalambos Seal (frog shaped)	EM - MM III
VS. 1A 102* Khania Museum A3223 bovine	Khania Seal (L)	LM III B
VS. 1A 103* Khania Museum A3224 cow & calf	Khania Seal	LM III B
VS. 1A 104* Khania Museum A3225 bovine (m)	Khania Seal (L)	LM III B
VS. 1A 124 Khania Museum A3182 bovine	Khania Seal (L)	LM III A1
VS. 1A 136 Khania museum 1559K bovine	Khania Sealing	LM IB
VS. 1A 139 Khania Museum 2116 bovine	Khania Sealing	LM III A1-2
VS. 1A 140* Khania Museum 1562 bovine & two lions	Khania Sealing	LM IB
VS. 1A 141 Khania Museum 1567 bovine head/bucranium	Khania Sealing	LM III A2-III B1
VS. 1A 145* Khania Museum 1561 bovine (m)	Khania Sealing	LM IB

VS. 1A 151 Khania Museum 1017 bovine	Khania Sealing	MM III-LM I
VS. 1A 152 Khania Museum 1557 bovine	Khania Sealing	MM III-LM I
VS. 1A 153* Khania Museum 1001-1004 calf	Khania Sealing	MM III-LM I
VS. 1A 154* Khania Museum 1538-1546 calf	Khania Sealing	MM III-LM I
VS. 1A 156* Khania Museum 2026, 2046-2064, 2098, 2099 cow & calf	Khania Sealing	MM III-LM I
VS. 1A 171* Khania Museum 1547-1549, 1551-1556 bovine (m)	Khania Sealing	MM III-LM I
VS. 1A 173* Khania Museum 1529-1535 calf	Khania Sealing	MM III-LM I
VS. 1A 196 Khania Museum Λ3196 bovine	Khania Seal (A)	LM III A-B
VS. 1A 197 Khania Museum Λ3205 bovine	Phylaki Seal (ring)	LM III A-B
VS. 1A 198 Khania Museum Λ3206 two bovines	Phylaki Seal (ring)	LM III A-B
VS. 1A 277* Mitsotakis Collection, Khania Museum Σ117 bovine head/ bucranium	Crete Seal (D)	MM III - LM III

VS. 1A 325 Mitsotakis Collection, Khania Museum Σ87 bovine head/ bucranium	Crete Seal (Pr)	MM III - LM III
VS. 1A 326* Mitsotakis Collection, Khania Museum Σ115 bovine head/ bucranium	Crete Seal (Pr)	MM III - LM III

CMS VS. 1B

VS. 1B 230 Rethymnon Museum Σ84 bovine	Armeni Seal (L)	LM III
VS. 1B 232* Rethymnon Museum Σ87 bovine	Armeni Seal (L)	LM III

CMS VII

VII 6 BM (GR/R) 1947. 9-26. 2 bovine head/ bucranium	Crete Seal (Pr)	EM III
VII 7 BM (GR/R) 1947. 9-26. 5 bovine head/ bucranium	Crete Seal (Pr)	EM III
VII 8 BM (GR/R) 1934. 11-20. 2 bovine head/ bucranium	Crete Seal (Pr)	1 st transitional phase
VII 9 BM (GR/R) 1947. 9-26. 1 bovine (?)	Crete Seal (Pr)	MM I
VII 10 BM (GR/R) 1936. 7-21. 2 bovine head/ bucranium	Crete Seal (Pr)	MM I
VII 13 BM (GR/R) 1947. 9-24. 9 bovine's head/ bucranium bovine (?)	Crete Seal (Pr)	MM I

VII 16 BM (GR/R) 1876. 5-13. 5 two bovines	Crete Seal (Pr)	MM I
VII 19 BM (GR/R) 1947. 9-26. 10 bovine head/ bucranium	Crete Seal (Pr)	MM I
VII 34 BM (GR/R) 1934. 11-20. 5 bovine head	Crete Seal (St)	MM II A
VII 45* BM (GR/R) 1876. 5-13. 3 bovine head/ bucranium bovine	Crete Seal (Pr)	MM III B
VII 65 BM (GR/R) 1901. 10-16. 1 bovine	Crete Seal (L)	2 nd transitional phase
VII 100* BM (GR/R) 1875. 10-22. 3 two bovines & man	Crete Seal (A)	LM II
VII 102* BM (GR/R) 1892. 7-20. 2 bovine (m) & man	Crete Seal (L)	LM II
VII 108 BM (GR/R) 1877. 7-28. 2 bovine & man	Crete Seal (L)	LM II
VII 123 BM (GR/R) 1877. 7-28. 3 bovine & goat man	Crete Seal (L)	LM II
VII 236* Cambridge Fitzwilliam Museum 118. 1937 cow & calf	Crete Seal (L)	LM III A

CMS VIII

VIII 3 J. M. Dawkins Collection bovine head/bucranium	Crete Seal (Pr)	EM III
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VIII 4 J. M. Dawkins Collection bovine head/bucranium	Crete Seal (Pr)	EM III
VIII 13 J. M. Dawkins Collection bovine head/bucranium	Crete Seal (Pr)	1st intermediate period
VIII 20* J. M. Dawkins Collection bovine head	Crete Seal (Pr)	MM I
VIII 33 J. M. Dawkins Collection bovine	Crete Seal (St)	MM II
VIII 47 J. M. Dawkins Collection bovine	Crete Seal (D)	MM III - LM IA
VIII 52* J. M. Dawkins Collection bovine	Crete Seal (L)	LM IA
VIII 53 J. M. Dawkins Collection bovine (?)	Crete Seal (L)	LM IA
VIII 66 J. M. Dawkins Collection calf	Crete Seal (L)	LM IB
VIII 85 J. M. Dawkins Collection cow & calf	Crete Seal (L)	LM IIIB
VIII 91 J. M. Dawkins Collection cow & calf	Crete Seal (L)	LM IIIB
VIII 107* J. M. Dawkins Collection bovine	Crete Seal (L)	LM II
VIII 116* R. W. Hutchinson Collection bovine head	Crete Seal (L)	2 nd Intermediate period

CMS IX

IX 1 CdM M 5808 bovine head/ bucranium	Crete Seal (Pr)	Prepalatial
IX 22 CdM N 4421 bovine (?)	Crete Seal (Pr)	Protopalatial
IX 109 CdM N 3441 bovine	Crete Seal (A)	NPP
IX 130* CdM N 3442 two young bovines	Crete Seal (L)	NPP
IX 131 CdM Coll. Pauvert de la Chapelle I two bovines	Crete Seal (L)	NPP

CMS XI

XI 142* Munchen, Staatl. Munzsammlung 1148 bovine head/ bucranium	Crete Seal (Pr)	
XI 143 Munchen, Staatl. Munzsammlung 1149 four bovine heads	Crete Seal (R)	
XI 248 Kopenhagen National Museum 1363 bovine	Crete Seal (L)	
XI 250 Kopenhagen National Museum 1365 bovine	Crete Seal (L)	
XI 251 Kopenhagen National Museum 1448 bull-man	Crete Seal (L)	

CMS XII

XII 137* MM 26.31.192 calf	Crete Seal (L)	MM III
XII 227* MM 26.31.290 two calves	Crete Seal (L)	LM II
XII 242 MM 26.31.296 bull man, lion, man-headed sphinx; lion & stag with young	Knossos (harbour) Seal (Cylinder)	LM II
XII 262* MM 26.31.392 bovine	Knossos (harbour) Stone Mould	LM II

CMS XIII

XIII 28 Boston, Museum of Fine Art 27.657 cow & calf	Crete Seal (R)	LM
XIII 83* New York, M. Velay Collection bovine	Central Crete Seal (L)	LM
XIII 84* new york, M. Velay collection bull-man	Knossos Seal (L)	LM

CMCG

CMCG 3 HMG 3162	Crete Seal (hoof shaped)	Prepalatial
CMCG 46 HMG 3440 bovine head /bucranium	Lasithi Seal (Pr)	Prepalatial
CMCG 54 HMG 3529 bovine head /bucranium	Crete Seal (Pr)	Prepalatial

CMCG 58 HMG 3352 bovine head /bucranium	Crete Seal (Pr)	Prepalatial
CMCG 72 HMG 3073 bovine (m)	Mallia Seal (Pr)	Prepalatial
CMCG 81 HMG 3043 bovine head /bucranium	Mallia Seal (Pr)	Prepalatial
CMCG 82 HMG 3262 bovine head /bucranium	Mallia Seal (Pr)	Prepalatial
CMCG 91 HMG 3019 two bovine heads /bucrania	Knossos Seal (Pr)	Prepalatial
CMCG 98 HMG 3150 bovine head /bucranium	Mallia Seal (Pr)	Prepalatial
CMCG 100 HMG 3048 bovine head /bucranium	Lasithi Seal (Pr)	Prepalatial
CMCG 108 HMG 3461 bovine	Mallia Seal (Pr)	OPP
CMCG 190* HMG 3372 bovine two headed bovine & man	Mesara Seal (Pr)	NPP- PPP
CMCG 224 HMG 3208 bovine	Crete Seal (L)	NPP-PPP
CMCG 226 HMG 3123 bovine	Mesara Seal (Pr)	NPP- PPP
CMCG 227 HMG 3091 bovine	Khersonisos Seal (L)	NPP- PPP

CMCG 228 HMG 3299 bovine	Phaistos Seal (L)	NPP- PPP
CMCG 229 HMG 3132 bovine	Malia Seal (L)	NPP- PPP
CMCG 233 HMG 3220 bovine	Crete Seal (L)	NPP- PPP
CMCG 234 HMG 3214 bovine	Crete Seal (L)	NPP- PPP
CMCG 245 HMG 3219 bovine	Crete Seal (L)	NPP- PPP
CMCG 246 HMG 3134 bovine	Knossos Seal (L)	NPP- PPP
CMCG 249 HMG 3422 bovine	Knossos Seal (L)	NPP- PPP
CMCG 258 HMG 3128 bovine	Khersonisos Seal (L)	NPP- PPP
CMCG 291* HMG 3100 bovine & lion	Crete Seal (L)	NPP- PPP
CMCG 292 HMG 3218 two bovines	Crete Seal (L)	NPP- PPP
CMCG 303 HMG 3309 cow & calf	Knossos Seal (L)	NPP- PPP

CMCG 305 HMG 3525 two bovines (m)	Crete Seal (L)	NPP- PPP
CMCG 311* HMG 3033 bull & lion	Crete Seal (L)	NPP- PPP
CMCG 352 HMG 3520 bovine head	Crete Seal (L)	NPP- PPP
CMCG 353 HMG 3307 bovine head	Knossos Seal (L)	NPP- PPP
CMCG 354 HMG 3419 two bovine heads/ bucrania	Crete Seal (L)	NPP- PPP
CMCG 357* HMG 3209 bovine & man	Knossos Seal (L)	NPP- PPP
CMCG 379 HMG 3316 bull- man	Phaistos Seal (L)	NPP- PPP

AT

AT 7 HMs 580p two bovine heads/ bucrania	Ayia Triada Sealing
AT 8 HMs 527 bovine head, lion head, dog head & bird	Ayia Triada Sealing
AT 50 HMs bovine	Ayia Triada Sealing
AT 51 HMs 502 bovine	Ayia Triada Sealing

AT 52 HMs bovine (m)	Ayia Triada Sealing
AT 53 HMs 574 bovine (m)	Ayia Triada Sealing
AT 54 HMs Gournia: 101 Ayia Triada: 497, 498, 499 bovine (m) & man	Ayia Triada & Gournia Sealing
AT 55* HMs 504 bovine	Ayia Triada Sealing
AT 56 HMs 500 bovine	Ayia Triada Sealing
AT 57 HMs 503 two bovines (m?)	Ayia Triada Sealing
AT 58 HMs 548 two bovines	Ayia Triada Sealing
AT 59 HMs 501 two bovines	Ayia Triada Sealing
AT 60* HMs bovine	Ayia Triada Sealing
AT 61* HMs 581 bovine	Ayia Triada Sealing
AT 63 HMs 515 bovine (m)	Ayia Triada Sealing
AT 66 HMs 541 bovine	Ayia Triada Sealing

AT 78 HMs 482 bovine	Ayia Triada Sealing	
AT 87 HMs 26 bovine & lion	Ayia Triada Sealing	
AT 88 HMs 588 bovine & lion	Ayia Triada Sealing	
AT 105* HMs 467 composite creature incorporating bovine head/ bucranium (f)	Ayia Triada Sealing	
AT 108 HMs bovine & man	Ayia Triada Sealing	
AT 109 HMs 544 bovine & man	Ayia Triada Sealing	
AT 110 HMs 516 bovine (m)	Ayia Triada Sealing	
AT 131 HMs bovine	Ayia Triada Sealing	
AT 145 Rome, Museo Pigorini 71974 bovine & man	Ayia Triada Sealing	
<u>CS</u>		
CS 10 AM 1938.753 bovine head/ bucranium	Elounda Seal (Pr)	EM II - MM I
CS 11 AM 1910.241 bovine head/ bucranium	Milatos Seal (Pr)	

CS 19 AM 1910.244 bovine head/ bucranium	East Crete Seal (Pr)	
CS 53 AM AE 1217 bovine head/ bucranium (?)	Crete Seal (Pr)	
CS 54 AM AE 1192 bovine	Central Crete Seal (Pr)	
CS 60 AM AE 1764 bovine head/ bucranium	Crete Seal (Pr)	
CS 68 AM AE.1215 two bovine heads/ bucrania	Central Crete Seal (Pr)	
CS 73 AM 1938.748 bovine head/bucranium	Elounda Seal (Pr)	EM II - MM I
CS 104 AM 1938.952 two bovine heads/ bucrania	Crete Seal (L)	LM
CS 105 AM 1938.951 two bovine heads/ bucrania	Central Crete Seal (L)	LM
CS 125 AM 1938.1101 bovine head/bucranium	Crete Seal (Duck shaped)	MM I-II
CS 167* AM 1938.792 calf head	Candia District Seal (Pr)	
CS 206* AM 1938.970 calf head	Mirabello Seal (L)	MM III
CS 211 AM AE 691 bovine head/bucranium	Diktaian Cave Seal (Pr)	

CS 236 AM 1938.1018 bovine	Crete Seal (L)	
CS 243* AM 1938.1032 cow & calf	Crete	MM III- LM I
CS 249 AM 1938.1079 bovine (m) & two men	Crete Seal (L)	
CS 283 AM 1941.120 bovine & woman	Crete Seal (L)	
CS 291 AM 1938.976 composite images incorporating bovine head	Crete Seal (L)	LM
CS 292 AM 1938.1039 bovine head	Central Crete (Psykhro cave?) Seal (L)	LM
CS 296* AM 1938.1027 two calves	Central Crete Seal (L)	LM
CS 299 AM 1941.125 bovine	Argyroupolis Seal (L)	LM
CS 300 AM 1938.1026 three bovines & man	Crete Seal (L)	
CS 301* AM 1938.969 calf	Knossos District Seal (L)	LM I
CS 311 AM 1938.1029 two bovines	Crete Seal (L)	

CS 312 AM 1938.1030 two bovines	Crete (Candia ?) Seal (L)
CS 317 AM 1938.1031 bovine	Rethymnon or Polyrrenia Seal (L)
CS 321* AM 1938.1069 bull-man & lion-man	Crete Seal (L)
CS 322* AM 1938.1071 bull-man	Psykhro Cave Seal (L)
CS 323* AM 1938.1072 bull-man	Milatos Seal (L)
CS 325* AM 1938.1070 bull-man	Knossos district Seal (L)
CS 331* AM 1938.1035 bovine (m) & lion	Central Crete Seal (A)
CS 333* AM 1938.1028 two calves	Rethymnon Seal (L)
CS 334* AM AE 690 two young cattle bovine v lion	Diktaian Cave Seal (L)
CS 336* AM 1938.1094 two calves	Crete Seal (L)
CS 345 AM 1938.1085 bovine, fish & bird	Crete Seal (L)
CS 356 AM 1938.1006 central bovine head/ bucranium & two bovine heads/ bucrania	Eastern Crete Seal (Cylinder)

CS 358* AM 1938.1091 bull-man & two bovines	Crete Seal (Cylinder)	
CS 366 AM 1941.130 bovine & griffin	Sybrita Seal (L)	
CS 383* AM 1941.92 two calves	Crete Seal (L)	
CS 27S (see CMS II7 184)		
CS 44s & KSPI V1 CS 44s: AM 1938.1082 KSPI V1: HMs 415/ 1-2, 1576-9 bovine (m)	Knossos Sealing	LM II
CS 45s & KSPI J1 CS 45s: AM 1938.1016 KSPI J1: HMs 129 AM 1938.1152 (?), HMs 1628 (?) bovine	Knossos Sealing	LM III A
CS 50s & KSPI G15 AM 1938.861 bovine & two lions/dogs	Knossos Sealing	
CS 52s & KSPI G6 AM 1938.1080 bovine & man	Knossos Sealing	LM II
CS 14P* AM AE 1230 bovine & lion	Ayia Pelayia Seal (L)	
CS 17P AM AE 697 bovine	Diktaian Cave Seal (L)	
CS 18P AM 1893.234 bovine	Rethymnon Seal (L)	

KSPI

KSPI C43 HMs 670 Bovine (m) & man	Knossos Sealing	LM II
KSPI F1 HMs 123 bovine	Knossos Sealing	NPP
KSPI G3 HMs 240, 1023 two bovines	Knossos Sealings	NPP/ 1410-1385 BC
KSPI G6 (see CS 52s)		
KSPI G9 HMs 376/ 1-2 bovine & lion	Knossos Sealings	NPP
KSPI G10 HMs 209 bovine & lion	Knossos Sealing	NPP
KSPI G11 HMs 113 bovine & two lions	Knossos Sealing	NPP
KSPI G13 HMs 284 two bovines	Knossos Sealing	NPP
KSPI G15 (see CS 50s)		
KSPI J2 HMs 109 & NM 5405A two bovines and two bovine heads	Knossos Sealings	LM II/ 1550-1500
KSPI N6 HMs 111 bovine	Knossos Sealing	LM II - LM III A1
KSPI N10 HMs 121 bovine	Knossos Sealing	LM IB - III A1

KSPI N13 HMs 124 bovine & animal (bovine?)	Knossos Sealing	LM II - III A1
KSPI O1 HMs 205 bovine & lion (?)	Knossos Sealing	NPP/ 1430-1405
KSPI O4 HMs 108 bovine & man	Knossos Sealing	LM IB - II
KSPI O5 HMs 118 two bovines	Knossos Sealing	NPP/ 1410-1385 BC
KSPI O12 HMs 139/1, 139/2 two pairs of bovines	Knossos Sealings	NPP/ 1410 - 1375 BC
KSPI Q20* HMs 143 bovine & man	Knossos Sealing	NPP
KSPI R3 HMs 289 two bovines	Knossos Sealing	1410- 1385 BC
KSPI R4 HMs 293 bovine v lion	Knossos Sealing	1410 - 1385 BC
KSPI R6 BC HMs 212, 213, 1000, 1005, 1597 bovine	Knossos Sealings	LM II / 1410 - 1385
KSPI R9 HMs 251 bovine	Knossos Sealing	Early 15 th century BC
KSPI R13 HMs 211 bovine	Knossos Sealing	
KSPI R19 & R 30 HMs 294, 292/1, 292/2, 292/3, 292/4 two bovines	Knossos Sealings	NPP

KSPI R34 HMs 270 bovine	Knossos Sealing	NPP
KSPI R38 HMs 367 two lions & bovine head / bucranium	Knossos Sealing	NPP
KSPI R42 HMs 310 bovine & lion	Knossos Sealing	NPP
KSPI R48 HMs 330/8, 330/9 bovine	Knossos Sealings	NPP
KSPI R52 HMs 330/1, 1247, 1614 bovine	Knossos Sealings	NPP
KSPI R71 HMs 311/7, 1229 bovine	Knossos Sealings	NPP
KSPI R74 & R97 HMs 308/1-3, 311/6, 1257, 1398, 1518 bovine	Knossos Sealings	NPP
KSPI R84 HMs 311/1-5, 330/5-7, 10 bovine	Knossos Sealings	NPP
KSPI R86 HMs 216 two bovines	Knossos Sealing	1500 - 1475 BC
KSPI R101 HMs 665 bovine's face	Knossos Sealing	1410-1385 BC
KSPI U7 HMs 424 bovine	Knossos Sealing	1450-1425 BC

KSPI U115 HMs 656 bovine head	Knossos Sealing
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KSPI V1 (see CS 44s)

MISCELANEOUS

Popham 1995 HMs 147, 313 bovine	Crete Sealings
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Popham 1995 HMs 232 two calves	Knossos Sealing
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Popham 1995 HMs 286 bovine	Crete Sealing
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Popham 1995 HMs 312 bovine head	Crete Sealing
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Popham 1995 HMs 379 bovine	Crete Sealing
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Popham 1995 HMs 1026 bovine	Crete Sealing
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Popham 1995 HMs 1261 bovine	Crete Sealing
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Popham <i>et al.</i> 1984:NC 20, pl. 186B HMs bovine head	Knossos, Seal (L)	MM III - LM IA/II
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Popham <i>et al.</i> 1984:193, pl. 187B HMs bovine & lion	Knossos, Seal (L)	LM I - II
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Popham <i>et al.</i> 1984:194, pl. 188C HMs bovine head	Knossos, Seal (L)	LM
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Popham <i>et al.</i> 1984:195, pl. 189D* HMs two calves	Knossos Seal (L)	LM
Betts 1967, <i>Kadmos</i> 6, fig. 12a HMs 613-624, 626-627 bovine (m) & man	Sklavokambos Sealing	LM IB
Betts 1967, <i>Kadmos</i> 6, fig. 6a HMs Gournia: 102 Sklavokambos: 612 bovine (m) & man	Gournia & Sklavokambos Sealing	LM IB
Betts 1967, <i>Kadmos</i> 6, fig. 3a HMs 628 bovine (m)	Sklavokambos Sealing	LM IB
Betts 1967, <i>Kadmos</i> 6, fig. 3b HMs 629 bovine (m)	Sklavokambos Sealing	LM IB
Sakellarakis & Sakellarakis 1997, fig. 802 a-b* HM Σ-K 2250 cow & calf	Phourni (Arkhanes) Seal (L)	LM IIIA
Sakellarakis & Sakellarakis 1997, fig. 785* calf head shaped	Phourni (Arkhanes) Stamp	LM IIIA
Sakellarakis & Sakellarakis 1997, fig. 805* HM Σ-K 2250 three calves	Phourni (Arkhanes) Seal (L)	LM IIIA
AR 1980-81:80, fig. 19a & b HM 2817 bovine	Knossos Seal (L)	LM IB
Evans 1921, <i>JHS</i> 41, fig. 6 bovine & man	Knossos Sealing	MM IIIB
Evans 1921, <i>JHS</i> 41, fig. 7 HMs 250 bovine & man	Knossos Sealing	MM IIIB

Evans 1921, <i>JHS</i> 41, fig. 8 bovine & man	Zakros Sealing	MM IIIB
Betts 13* HMs 1037 cow & calf	Knossos Sealing	
PM IV fig. 597 B, d HMs 221 cow & calf	Knossos Sealing	LM
AM 1971.1136* calf & lion	Knossos Seal (R)	LM
BSA 74:263, pl. 33 f. g & pl. 34 AM 1938.1087 cow & calf	Knossos Matrix	LM II A - III B

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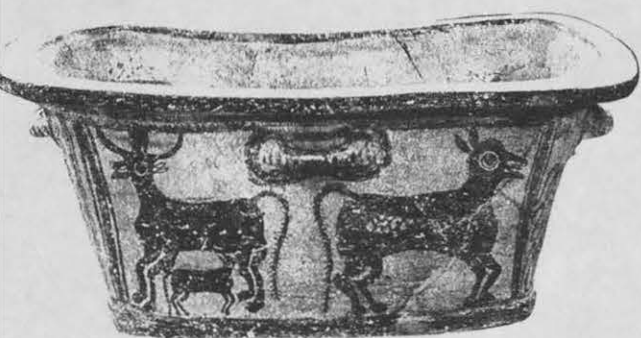
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PLATE I



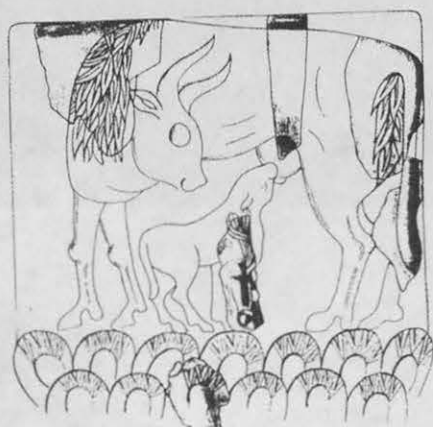
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PLATE II



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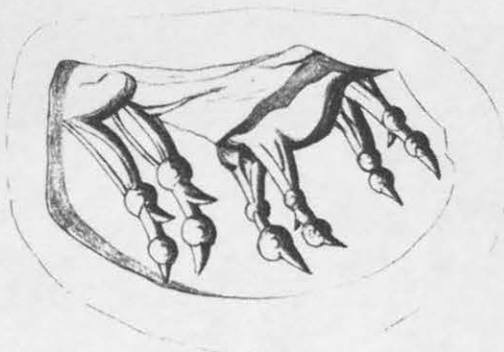
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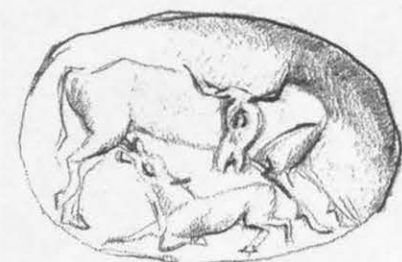


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PLATE III



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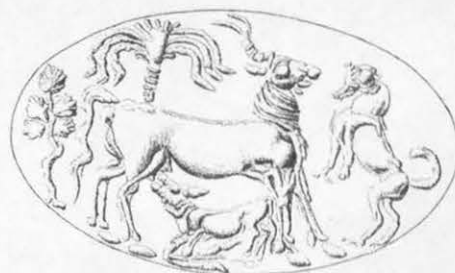
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PLATE IV

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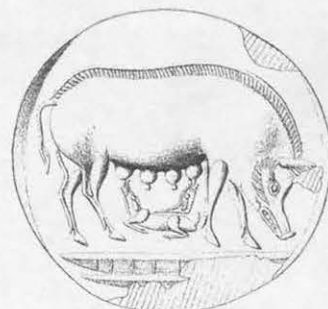
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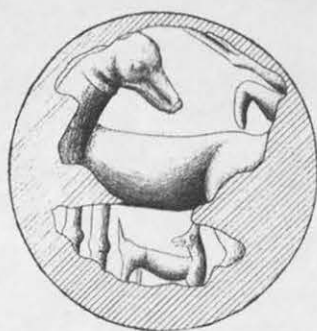
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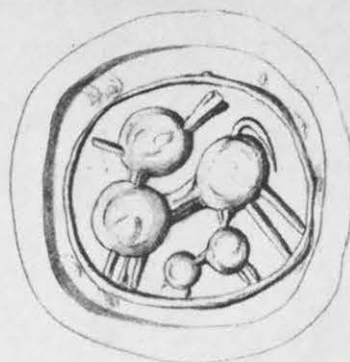
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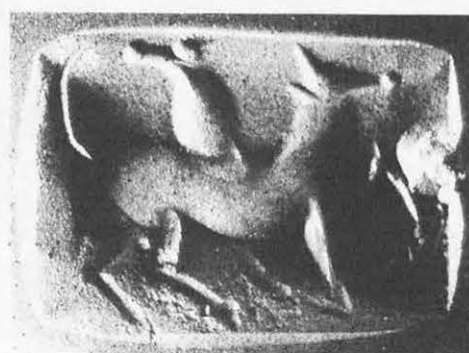
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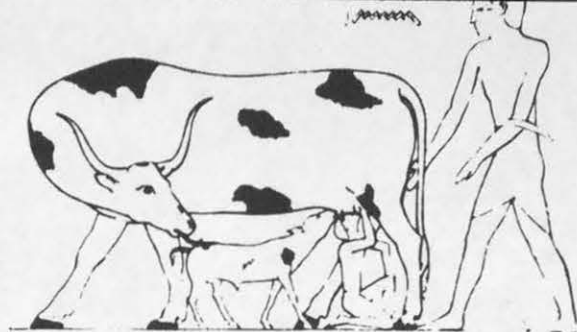
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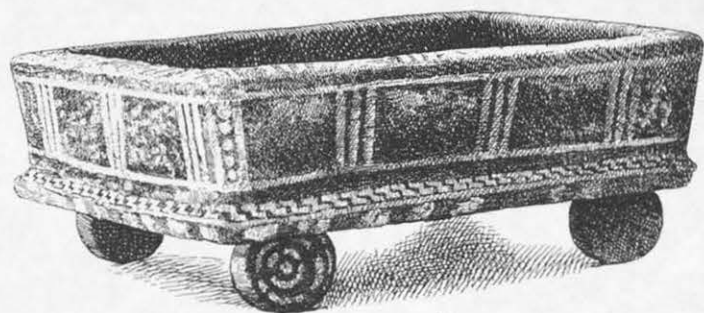
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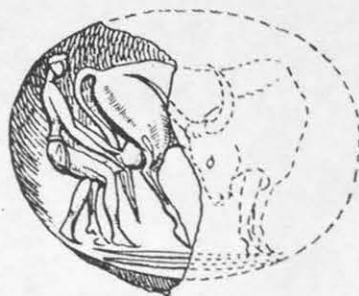
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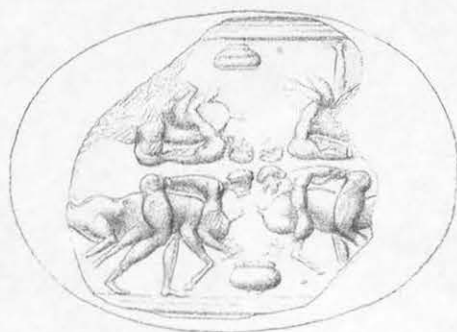
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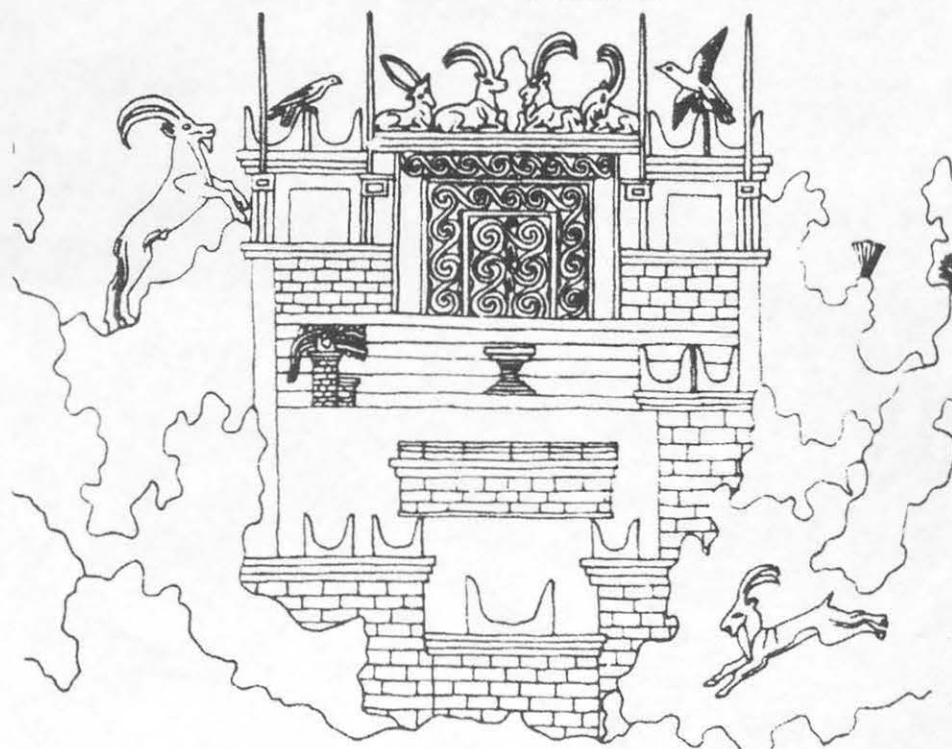
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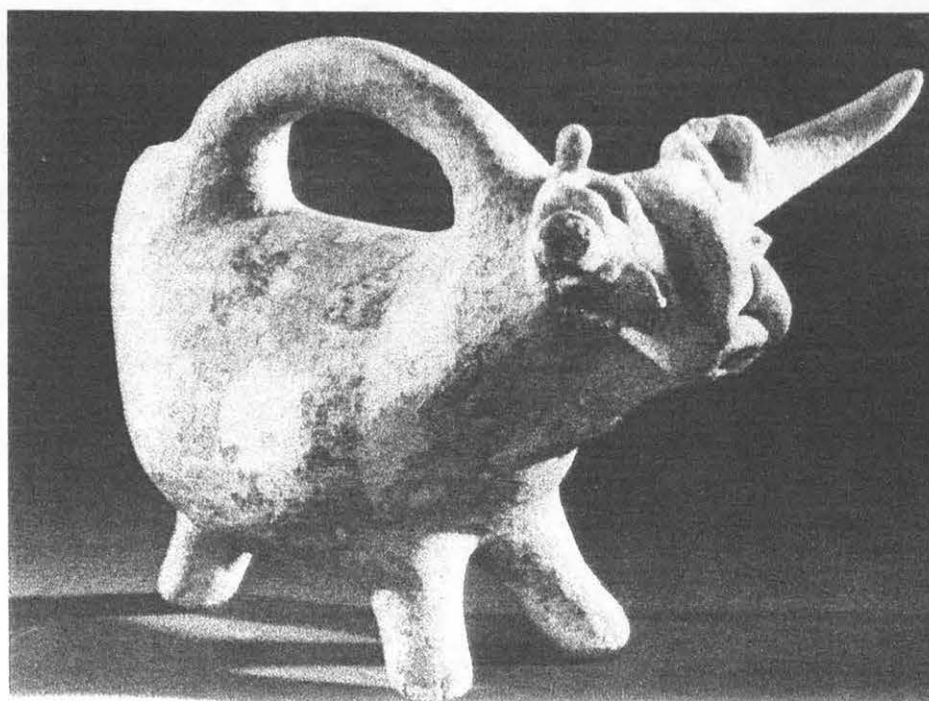


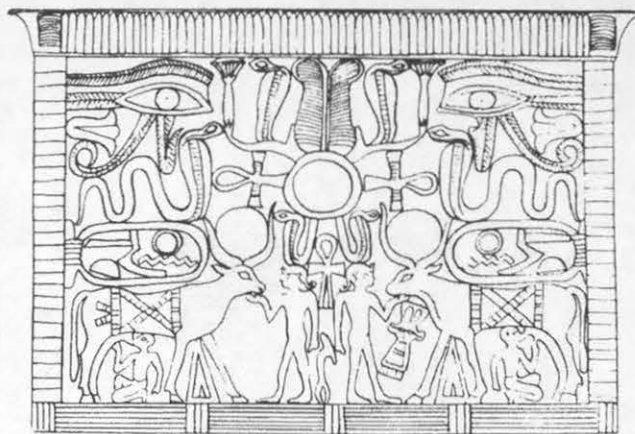
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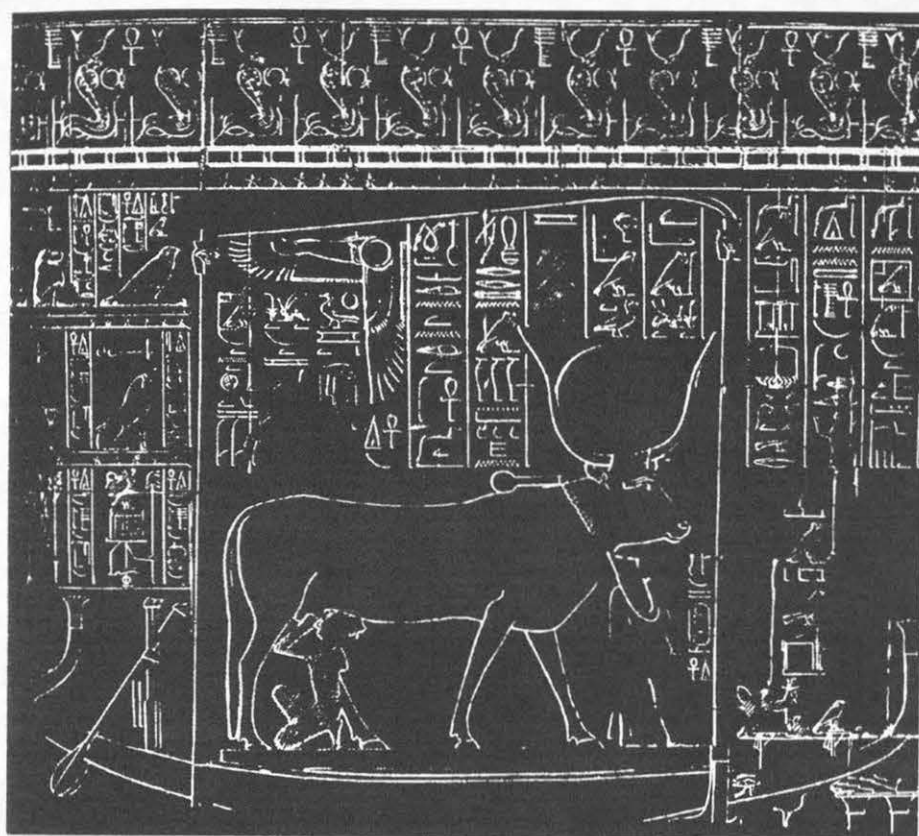
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